The Orb

by

Gerald I. Lebau

Oh I count most discourse taint.

We hint;—no ties ruin us.
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for the sake of my father, Harry Lebau, whose deep investigation and study in every field of human endeavor has always been an eloquent example of Man’s relentless search for absolute truth.
PREFACE

This book is a qualitative description of the mode of operation of everything inanimate in the world, from atomic nucleus to galactic universe. It started many years ago as an attempt to decipher the mechanism of gravity. In that endeavor, it gradually became evident that to reach that goal the detailed structure, composition and physiology of everything else also had to be understood.

In following the chains of logic through their almost interminable convolutions I gradually found that many modern concepts had to be traced back to their origins, and then pressed even further back, into their premises. Many of those premises, it developed, had to be given up and denied. Indeed, so intertwined and dependently inter-related are the many diverse theories of modern science, that it slowly became evident that a thread of error permeates all the branches of the existing tree of knowledge. The very words used were found to possess erroneous implications and even inherent contradictions. In time, new modes of thinking developed, without words. Later, to communicate the conclusions, old words had to be redefined, discarded concepts had to be polished up and revived, existing concepts had to be destroyed (if only to be rebuilt again with slight but enormous changes), and some new words had to be invented.

This is not an easy book to read. Part I deliberately exposes many inconsistencies of existing theory, but in so doing assumes the appearance of confusion. It is the theories that are confused, not the presentation. Press on. Part I opens the mind for the rest of the book, by demonstrating some of the many contradictions, inconsistencies and errors of logic of existing theories. Subsequent Portions of the book introduce concepts which depend for justification on later parts, but which are the bases from which those other parts develop.

It happens, therefore, that the more sophisticated you are in the teachings of presently accepted scientific theory, the more difficult it will be to continue through the first fourth, or half of the book. On the other hand, the more learned the reader, the more he may appreciate the later portions.

All in all, this is a highly interconnected and interdependent set of concepts. No one part can be fully understood until all of it has been finished. The reader’s patient indulgence is urgently requested. The major intellectual effort required to complete the book should be most adequately rewarding.

Gerald I. Lebau

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PART I

Critical Review Of

Einstein’s Theory Of Relativity
The ignorant (but far from unintelligent) Greek philosophers of long ago thought that matter is made from solid particles called “atoms,” and that a void exists between these atoms. It wasn’t until the 17th century that time of propagation of light seriously challenged the old Greek atomic theory by demanding a continuous medium to conduct such wave energies. It took very few years for electricity, light, and magnetism to be set into mathematical equations which also demanded a continuous medium. In response to these logical demands, coupled with the formal equations, the existence of ether was gradually admitted. It was postulated as an unmoving, highly tenuous material, separate and other than atomic matter, perfectly elastic, solid, gel-like, and everywhere the background material through which solid atoms moved.

By the 1800’s, nature was thought to consist of solid atoms composing “ponderable” matter, all of which moved through a stationary material ether which acted as the conducting medium for all electromagnetic energies. Further, it was soon postulated that not only is “apparently” solid matter actually made of widely separated solid particles (atoms), but the atoms themselves are made of widely separated solid particles. The ether, in its stationary cosmic grandeur, filled all the interspaces, and carried wave energy.

Close on to the end of the 19th century a critical experiment was devised and performed to establish and use this overall theory once and for all. The total combined theories of classical physics supported each other in predicting the
results of that experiment and when it failed, that marked the end of classical physics in favor of relativity and quantum theory.

The famous Michelson-Morley test for the speed of the ether drift is the crucial experiment to which we refer. The premises for that test were numerous, and all of them had numerous scientific supports. They were:

1. All matter of a “ponderable” kind is made of kinetic atoms, each relatively far from the others.
2. A continuous material medium, other than atomic matter, fills all interatomic space, conducts light, and is cosmically motionless.
3. Since all ponderable matter is kinetic-atomic, and since the Earth is made of this kinetic-atomic matter, it follows that the kinetic atomic Earth moves through the stationary ether.
4. The principles of mathematics can do no wrong. Hence, if A moves away from B at 10 miles per hour, it is equally correct that B moves away from A at 10 miles per hour and thus the classical principle of relativity holds true, as do all mathematical proof s.
5. It follows that if light is carried by the stationary ether, it will move at a constant rate in any direction with respect to its starting point in that ether, and will thus, according to premise 4, move at a variable relative speed as measured by items themselves in motion through the ubiquitous ether.

In accord with these premises, it seemed that all we had to do was to measure the difference in relative speeds of light sent in various directions to find the speed of Earth through the absolutely stationary ether. Once we had the “absolute speed” of Earth accurately measured, we could then use Earth as the base for measuring the absolute speeds of everything else in existence.

The Michelson-Morley measurements required a certain delicacy of instruments, although it was rather simple, to have brought the structure of classical physics tumbling down. It consisted of some Mirrors, a viewer, a light, a stone, a pool of mercury, and an observer.

The stone was set afloat in the pool of mercury, so as to prevent any motion of the apparatus. The apparatus was then mounted upon the stone as shown in Figure 1-1.
Figure 1-1.

A is the light source, B is the glass which both transmits and reflects light, C and D are mirrors, and E is the viewer. The light goes from A to B, as AB. At B some of the light goes through, as BD, while some is reflected at 90 degrees to BC. If BC equals BD the paths are of equal lengths. If light speed varied relative to the moving apparatus (in remaining constant relative to a fixed ether), then it would take unequal time intervals for the light to traverse the two equal but differently directed paths, and interference effects should appear as the two beams reach the viewer out of phase with each other. The interference pattern should then be analyzable so as to yield the relative difference of speed of the two portions of the light beam, and thus to provide a measurement of the absolute speed of Earth through the ether.

When the experiment was performed the results were that no interference pattern was to be seen. All subsequent performances of this type of test yield the same result—no change in the speed of light, or of radio waves, or of any kind of electromagnetic waves occurs as a result of direction alone.

The immediate suspicion, namely, that Earth drags its surrounding ether along with it, was discarded when a set of spinning discs also failed to cause light speed variations. (If kinetic-atomic Earth drags the ether with it, so should kinetic-atomic spinning discs.)

It was suggested, among numerous other things, that perhaps the failure of the experiment occurred because the instruments varied in size with their motion through the electromagnetic conducting medium. This suggestion gained imposing favor when it was remembered that the electrical forces of attraction had become part of the explanation for cohesive actions of the atomic particles which compose ponderable bodies. If electrical force holds bodies together, it was thought, and electrical force varies with the variation of the speed of an
electrically charged body through the conducting medium, then a body should shrink as its increased speed through the ether strengthens its internal attraction forces.

Having ADOPTED THIS CONCLUSION, the mathematical physicists then worked out an equation (Lorentz-Fitzgerald) providing the amount of contraction per unit increase in speed which would be necessary to cause a shrinkage of the Michelson-Morley instruments sufficient to exactly compensate for the change in light speed, WHICH THEY STILL MAINTAINED OCCURS. Alas, they didn’t believe their experiment.

Following the Lorentz-Fitzgerald contraction hypothesis and its equation-derived-to-"explain"-the-experiment, it was decided that even if such a contraction occurred, there should be both residual strains in various materials as well as a residual ether-speed which should be experimentally detectable. Experiment again failed to show such events.

It is highly interesting to contemplate the history of scientific theory. The Greek philosophers of several thousand years ago started their examinations of nature by directly observing things. They started with direct sense evidence. From their initial unprejudiced observations they eventually produced the kinetic atomic theory, wherein all matter was thought to be made of very small solid particles which persist unchanged through all arrangements into gross objects.

Soon after this theory was devised it became evident to them that in order to have such “atoms” it was necessary that there be something other than the atoms to act as the separating go-between. There had to be a “place where matter is not” in order for there to be individual particles.

In compliance with their prior conclusion that atoms are perfectly solid particles, and are the components out of which all matter is made, yet require a something-else as go between, the Greeks next decided that the intervening space is an existent void.

With this concept, i.e., that all matter is kinetic atomic with a lot of emptiness between the atoms, the Greeks promulgated the inevitable consequence that the senses give us false pictures. (The senses show no holes in material objects. They also show colors, etc., which cannot be explained in terms of mere atoms and spaces.)

With this denial of the validity of sense evidence, scientific progress turned to the formal tool of mathematics for assistance. At first, mathematics was itself based on self evidently true premises. The self-evidence of the truth of the axioms was described as “intuitive.” In fact, however, all “intuitive” knowledge must necessarily derive from sense evidence. Thus although the mathematical tool yielded valid data, being itself sense-evidence-derived, the Greeks maintained their denial of the validity of the senses to its final extreme. They decided that
only abstract mathematical forms are real in nature, and that all else is illusion. The dark ages naturally followed.

After a time, sense evidence was readmitted to scientific procedure and progress resumed. The kinetic-atomic plus void theory was maintained, as well as the intuitive truth of the mathematical premises. The contradiction of the two was ignored long enough for many modern (Galilean-Newtonian) advances to become firmly established.

It was only when the mathematical conclusions (sense-evidence derived) were directly faced with kinetic-atomic-void theory (sense-evidence denying) that the mutual contradiction calamitously revealed itself.

At this point (the Michelson-Morley experiment and thereafter) scientific theory decided in favor of illusion by maintaining the kinetic atomic theory and denying that mathematical axioms are either self-evident, true, or intuitively understood. Science revised its mathematical tool into a set of admitted inventions, applied these abstractions to the study of the illusory atomic theory, and came to the modern conclusions that matter is energy, that everything is relative (of no actual size or temporal duration), that the senses give pictures so completely remote from reality that there is no common ground from which they can proceed toward ultimate truth, and finally that “reality” and “truth” are scientifically meaningless.

The history of science is that of a long chain of consequences deduced from a number of hypotheses. The first, basic, initial and unquestioned hypothesis of modern science is so totally accepted that even though it seems completely in conflict with both sense and senses, it is no longer even recognized as a hypothesis. That which underlies all theories of modern science is the hypothesis that matter is kinetic-atomic in a void.

We are now going to enter into a dialectic presentation of some of the chains of argument which led to the theory of relativity. In the process I may be unduly harsh, for which I apologize in advance. It should be borne in mind that all of the logic of Einstein is valid as long as we stay within the bounds of his given hypotheses, which are that the speed of light in vacuo is a constant, that the principle of relativity is valid, and that mathematics can do no wrong. It is only proper to point out in advance that our counter arguments do not accept those premises and are therefore somewhat unfair. We are arguing from a much broader base, a prior set of hypotheses.

We are arguing from the position that the final conclusions which Einstein had deduced from the (forgotten as a hypothesis) theory of kinetic atoms in a void are such as to prove that hypothesis wrong!

In short, we shall attempt to show that a singularly odd thing has happened. A thing which, when properly understood, will provide a savory mental morsel of many and varied flavors. It appears that Dr. Einstein arrived at a number of
mathematical conclusions which are an exact mathematical picture of nature, but that he reached that goal by starting with a number of incorrect (false) assumptions, deducing a number of consequences which are “true” within the frame of those assumptions (and are therefore themselves false). He then altered the meaning of all prior assumptions (theories) which disagreed with his deductions, and then he hooked up the whole chain of “true” but false logic into a coherent mathematical union.

As a result of these many peculiar conclusions we have been living in a strange interlude during which the only basic explanations of nature which science can provide consist of a series of abstract uncertainty equations, where “abstract” is a scientifically holy word whose only apparent meaning is, “without any rational explanation.”

In truth, however, the incomprehensibility of the theories stems from the inconsistencies of the premises, the moebus-strip nature of the logic, and the non-existence of the space-time-continuum-in-a-void conclusion.
Chapter 2

Reality Vis-a-Versus Mathematics

There are two aspects to the theories of relativity. There was a presentation based on logic, and there was a presentation in terms of mathematics. We shall now engage in a point-by-point criticism of the logic of Einstein’s relativity theory in order to illuminate the errors which led to the denial of the real and physical in nature.

The logical development of the general theory of relativity gained general acceptance in the world of science because the predictions of the mathematical conclusions were interpreted as holding fairly accurately in nature. “If the mathematical predictions are correct, and the mathematics comes from the logical theory, then the logical theory must be correct,” is about how it went. The trouble with this neat conclusion is that Einstein’s logic did not precede the mathematics at all. The mathematics came first, and the theory of relativity was an after-the-fact explanation.

Since the predictions of the mathematics are found to hold approximately accurately in nature, we may accept the mathematics as somewhat valid. Not so for the theories of relativity, however. The theory itself leads but to failure—indeed, it ensures total failure in the efforts to find understanding as to the ultimate nature of reality.

The fact that the mathematics of Einstein’s theories worked is reason for us to give up much of classical physics. But the fact that Einstein’s theories led to the denial of a material ether, then to the conclusion that matter itself is a brand of energy, and then left us with energy as an undefinable mystery is sufficient for us to demand that reason be critically applied to these confused theories.
Einstein once wrote that if even one point of his logic was found to be in error, the entire theory must be given up since it is so tightly consistent in step-by-step logical construction. We shall find, to our initial surprise, that every single logical step is false!

In that his logic was impeccably consistent (every single point is equally false) the mathematically formulated circle ends up with everything in its correct relation to everything else. The mathematics thus works, but the theory ensures non-comprehension of what actually is happening in the objective world.

Isaac Barrow, teacher of mathematics to a Newton who knew how to think as well as measure, said, “Mathematicians take up for contemplation those features of which they have in their minds clear and distinct ideas; they give these appropriate, adequate and unchanging names; then, for the investigation of their properties and the construction of true conclusions about them, they apply a priori only certain axioms which are exceedingly familiar, indubitable, and few in number. Similarly, the hypotheses which they set up a priori are very few, in the highest degree consonant with reason, and undeniable by any sane mind.”

Newton chose to consider that absolute time and absolute space exist, realizing full well that there was also relative time and space open to the arbitrary choice of the observer or measurer. When Newton says that there may be no such thing as equable motion from which time may be accurately measured, he clearly differs from Einstein. He clearly considers time as a measure of duration, which measure has no dependence on speed of slow or fast clocks, or any other physical motion. He considers space as a mathematical, fixed and immovable framework in which all things exist and move.

With time arbitrarily constant, and a fixed coordinate spatial frame in all the realm of nature, it was then easy for him to begin to set all things into their proper relative positions within that geometry.

What difference does it make that space may or may not be empty, or may even be variable in density of material, if all exist against a hypothetically constant background of an arbitrary geometry? To that geometry, all will be in their proper relative places, and more than that mathematics cannot do.

That Newton realized that his positive findings might contain fine errors is well disclosed by his frequent statements that should anyone ever develop physical experiments that denied his mathematical conclusions, the conclusions would have to be revised. It is granted that enormous amounts of basic scientific theory would have to be revised in order for the Michelson-Morley experiment to be accepted, i.e., the speed of light is constant in any direction, in a closed Earth-level chamber, regardless of its direction—thus showing that the light-conducting medium in the experiment is absolutely at rest.

We should nonetheless agree with Newton that it is more conducive to true scientific advancement, and indeed to the advancement of all modes of human
relations, that empiric evidence be accepted as valid rather than that prior conclusions of (mathematical) theory override experimental results.

Why did the people of mathematical physics insist, nevertheless that light speed really did vary, that said variation a la direction was hidden by space and time alterations of specifiable amounts (Lorentz contraction equations), and that a variable light speed is really constant while intuitive understanding of space, time, mass, matter, energy, and all self-evident truth is either erroneous, meaningless or not to be thought?

To bring a note of levity into the discussions in regard to relativity, we shall introduce Mr. Duggie and Glird into the picture. They are two imaginary creatures from an unearthly school of experience, in which centuries of schooling produce teachers for the University of Padu, which teachers are also the students of the school. They once interviewed me for admission, but they found my earthlingness incompatible.

During the course of that “interview” we had taken a trip around the universe in a sort of flying lounge-room-laboratory, whose motive power consisted of a self-contained and controllable gravitational field. On the trip we engaged in lengthy arguments about various scientific concepts.

With respect to the items considered in Chapter 1, Mr. Duggie had said, “Let us glance at the metaphysical opinions of one of the most representative thinkers of this Age. Let us see what measures Einstein would have us substitute for clearly understandable and self-evidently true axioms.”

He went to the book cabinet, pulled a tab, and quickly returned with Einstein’s 1931 book “Relativity,” in the Peter Smith translation. He flipped through the pages a moment, then began to quote. “---most of you---made acquaintance with---Euclid’s geometry---you would certainly regard every one with disdain who should pronounce even the most out-of-the-way proposition of this science to be untrue. What, then, do you mean by the assertion that these propositions are true? Let us proceed to give this question a little consideration. Geometry sets out from certain preconceptions, such as ‘plane,’ ‘point,’ and ‘straight line,’ with which we are able to associate more or less definite ideas, and from certain simple propositions (axioms) which, in virtue of these ideas, we are inclined to accept as ‘true.’ The question of the ‘truth’ of the individual geometrical propositions is thus reduced to one of the ‘truth’ of the axioms. Now it has long been known that the last question is not only unanswerable by the methods of geometry, but that it is in itself entirely without meaning.”

“I am greatly stricken by the obvious change of emphasis between the mathematical metaphysics of Barrow-Newton and those of the moderns.” Dug spoke. “Where Barrow told of ‘clear and distinct ideas’ with ‘appropriate, adequate and unchanging names’ and ‘axioms which are exceedingly familiar, indubitable, and few in number,’ Einstein further denies the validity of the senses
by first making geometricians’ ideas ‘more or less definite’ and then considering the truth of the axioms ‘entirely without meaning.’”

He took back the book and said, “It should come as no surprise to you that it should say here, ‘The concept ‘true’ does not tally with the assertions of pure geometry, because by the word ‘true’ we are eventually in the habit of designating always the correspondence with a ‘real’ object; geometry, however, is not concerned with the relation of the ideas involved in it to objects of experience, but only with the logical connection of these ideas among themselves.’”

“It does come as a surprise,” I replied. “If geometry is a science of measurements, or 'metry' then how can it measure without objects to be measured? If geometry claims to have nothing to do with objects to be measured, then not only the axioms and propositions, but the entire subject of geometry has no relation to anything at all. Geometry must be totally worthless. How then do the scientists expect so fantasy-ridden a worthlessness to yield information about an objective and real world? How did they even succeed in making predictions about real things which were later found to be true? Without quotes.”

So long as mathematicians were merely concerned with ideas which possess more or less meaning, and then only with imaginary relations among these vagaries, we could have ignored them completely in our search for understanding. Fortunately, the mathematicians are wrong in their denial of the worth, truth and meaning of geometry. They have split personalities about their science, as you may appreciate from the words of Eric Bell. After agreeing with the denial of any truth in geometry, and after accepting the mathematics of relativity, he says, “... the equations describing natural phenomena must be invariant under all transformations of the space-time coordinates. Equations which do not meet this condition of invariance are tainted with peculiarities due to the observer’s reference system, and are not intrinsic in nature.”

Mr. Bell is but presenting the ideas of science, thus he is not responsible for the state of intrinsic incompatibility of mathematics’ precepts. Nevertheless, it should be obvious that nature, and objective reality, is always the final court of appeal for any and all mathematical conclusions. The original axioms must be either true or false, in that they either conform to reality or inevitably reveal the imaginative unreality, hence untruth, of their assertions.
Chapter 3

Mathematics: True, False, or Meaningless

My friend, teacher, partner and erstwhile opponent, “Duggie,” and I, attended by an observer who was the merged representative of the dialectic school of Padu, were situated in a well-equipped lounge room floating motionless in space. We were far from any star, and way out of sight of the solar system which was the mother of my home planet.

For some time now we had been reviewing the data which led to the impasse of classical physics, and had decided that the results of the Michelson-Morley test for varied speeds of light according to its direction of motion relative to the ether, had been misinterpreted by science. Duggie insisted that it actually proved that the prime premise of classical physics, as well as modern physics—the premise that matter is made of discrete atoms with intervening spaces—is wrong. He said that since the surrounding medium was the light conductor, and since the light showed no change in its velocity regardless of direction, then it was only proper to conclude that the conducting medium was at rest relative to the measuring apparatus.

That being so, he said, it follows that there can be no holes in solid matter through which the ether is supposed to flow. He went on to show that since light passes through a “vacuum” chamber, where the chamber has only the remnants of the air that had filled it originally, the air must itself be made out of the ether and must be continuous. He informed me, once, that the ether of air is continuous, but not homogeneous. The cause of difference of state, as well as of local configurations and elements, is motion and pressure, called “energy.”
Before entering into a series of dialectic considerations of Einstein’s various experiments, and before acting out these imaginary procedures, it would be helpful to review the historical setting in the world of theoretical science when Einstein arrived upon the scene. Such a review is very concisely done in “Science and First Principles,” by F. S. C. Northrop, 1931.)

“Mechanical and Electromagnetic Theory Before Einstein”

“We noted that the essential contribution of the mechanics of Galilei and Newton was the statement of the physical theory of nature in terms of the near-at-hand. This made experimentation important and measurement and quantitative treatment possible. The specific discovery which produced this new procedure was Galilei’s designation of force as that which produced acceleration, or a change of velocity. This made time an important concept and gave rise to the principle of inertia, which in turn provided a meaning for mass as that which preserves constant velocity. The principle of inertia also presupposed the existence of absolute Euclidean space in its definition of rest and rectilinear motion. Thus in Galilei’s new conception of force four absolutes—mass, force, space, and time—were present.

“We noted also that matter was dualistic in character. It tends to produce rest or uniform motion in itself and accelerated motion in its neighbors. Science expressed this fact by saying that a body has two masses, the one inertial, the other gravitational.

“However, Galilei’s experiment at the Tower of Pisa had indicated that these two masses are quantitatively identical. More precise experiments have confirmed this conclusion. This fact is referred to as the equivalence of inertial and gravitational mass.

“The Newtonian conception of space was somewhat complicated. The presupposition of it in the definition of inertia suggested that it is absolute. Furthermore, the atomism and motion of the matter required a referent other than the moving masses. This referent had been identified with space.”

He means “void,” not “space.”

“Thus the notion of space seemed to be implicit in the notion of matter.” Newton says precisely this. At the beginning of his work ‘Principia’ he writes, “All things are placed . . . in Time as to order of succession, and in Space as to order of situation. It is from their essence or nature that they are Places.’ In other words, the idea of a mass apart from some common referent other than mass is unthinkable.

“In order to measure a distance to which one cannot apply a measuring rod directly at least two things are essential. In addition to a physical standard measuring rod, one must have a system of coordinates and this system must have
its zero point fixed to some molar object. Hence, all the measurements of distance which we make are relative; they refer to a particular reference body which is chosen.

“The system of coordinates which one uses is determined by the nature of the space in which one’s measurements are made. Since Galilei and Newton took it for granted that space is Euclidean, systems of coordinates for Euclidean space were used.

“Such systems (Euclidean) are constituted of three straight lines intersecting at a zero point at which they are perpendicular to each other. Such a system is called a Cartesian system of coordinates. Its characteristic is that any point in a space can be uniquely designated by three numbers which indicate the distance of the point in question from the zero point along each of the three axes of the system. A Cartesian system of coordinates may be defined as a three-dimensional system of lines referred to a common zero point, and obeying the rules of Euclidean geometry.”

Northrop goes on to discuss the way in which inertia limits the practical choice of coordinate zero bodies to the so-called “fixed stars,” and eliminates rotating or non-inertially moving bodies. He objects to such a state of affairs on the grounds that “our classical laws of nature held only if we approached nature from a certain physical standpoint.”

Then he discusses how Galilei noted that any inertial body would be satisfactory as a frame of reference, wherefore, since the chosen frame’s referent body is always taken as at rest, it becomes impossible to distinguish between rest and motion between bodies that are inertially moving relative to one another. Either one may be chosen as at rest.

Northrop: “With respect to the aforementioned bodies a and b, ‘What Galilei noted is that one can regard either of these bodies as at rest without altering the laws of motion which describe their behavior. a may be taken as at rest, in which case b will appear to Move relatively to it in a certain direction at the rate of 40 miles per hour; or b may be taken as at rest in which case a will appear to move in the opposite direction with the same velocity. This equivalence of inertial or Galilean frames is known as the principle of relativity for Galilean frames of reference. It means that the laws describing a given phenomenon have precisely the same form, whether observations are made from one Galilean frame of reference or another.

“. . . It is this principle which enables our laws to transcend the necessary approach to nature through coordinate systems and reference frames. It does this by expressing the fact that laws of nature preserve a constant form through all the different space and time values that measurements from different reference frames reveal.”
“. . . It is to be noted, however, that in classical mechanics this principle held only for Galilean frames of reference. We can now see this was a very undesirable and unsound state of affairs. For it means that the laws of Newtonian mechanics apply, not to objective nature, but to nature referred to certain physical objects called Galilean frames of reference.

“It is the great achievement of Einstein to have removed this last remnant of relativity by extending the principle of relativity so that it applies to any frame of reference whatever.”

Some following pages of Northrop may be compressed into the statement that the referent for motion and inertia, which Galilei and Newton identified with empty space, was revealed to be variable depending on the choice of coordinate reference bodies. Absolute space became non-existent, for measuring purposes.

Northrop: “Such was the theory of fundamental principles and concepts in classical mechanics at the opening of our century. Nature was conceived as a system of masses and forces operating in absolute space and time. Force was conceived as that which produces a change of velocity. Time was regarded as an endless series of instants, such that if two events were assigned correctly by a one-to-one member of the series, they must be assigned to the same instant by all observers who measure correctly. Mass, when considered as acted upon by external forces, was conceived as of two kinds, one the inertial mass which opposes a change of velocity, the other the gravitational mass which is responsible for weight. In theory these two masses of a given body were different; in practice they were quantitatively identical; hence, the principle of the quantitative equivalence of inertial and gravitational mass. Space, on the other hand, was absolute in theory for Galilean frames and in theory and practice for non-Galilean frames of reference, and relative in practice for Galilean frames. This latter fact, and the partial success in escaping from the relativity which measuring introduces, expressed themselves in the principle of relativity for Galilean frames of reference.”

“This principle of relativity,” Duggie said, “how did it fit in with the electromagnetic theory and light waves? How did it lead to an ether test and the later theories of special and general relativity?”

As I told you a long time ago, “A number of mathematicians had come up with a unified mathematical formulation for the phenomena of optics, electricity and magnetism. They had experimentally verified their findings. In that formulation those energies all appeared to be expressions of a common physical action, the transmission of waves of varied interval through and by a continuous medium. That medium was named the ‘ether.’”

“Hooray for our side,” Duggie shouted. “Now we have the results of tested mathematics to prove that there must be an ether medium. Silly of them to have expected it to be other than matter, though.”
“They had no choice,” I explained. “Matter was conceived as discontinuous. Atomic. Clerk Maxwell unified the entire body of optical, electrical and magnetic phenomena into one set of electromagnetic equations, but then it was noted that the equations did not apply to electromagnetic bodies that were in motion. When Lorentz generalized those equations it was seen that even electricity is atomic. The electron became the basic unit of nature.”

“What is an electron?” asked Duggie. Whereon I slithy-toved into a clujent and admitted that no one knows.

“It might soon have been suspected, if only because of Zeno’s famous atomic turtle and hare race, that there was something odd about the fact that the continuous always ends up discontinuous as soon as it moves into mathematics.” He waited for a laugh, then, not getting it, he said, “That’s a joke, son. When mathematics treats of moving entities their motions always end up discontinuous. The continuous ends up discontinuous as soon as it moves . . . into mathematics. Get It? Har Har!”

“Har har,” I mumbled back at him. “So what?”
“So on with your development, sourpuss.”
“It was readily seen that if Maxwell’s equations were correct, it would be possible to measure the velocity of the earth relative to the static absolute ether.”

“Now hold on. Hold on a minute there.” My buddy jumped up and strolled back and forth before me. “I’m tired of this word ‘absolute’ that keeps popping up all the time. What, precisely, is supposed to be absolute about the ether? And what makes everyone so sure that it must be at rest? With reference to what is it supposed to be at rest if something else is always required as the referent for rest or motion?” He kicked over the still-assembled M & M experiment apparatus, turned and barked, “No wonder they negated their experiment. Always trying to prove wrong theories. Blah—blah—blah—.” I stopped listening. After a while he calmed down.

“Regardless of your anger, of which they knew nothing, the scientists quickly recognized that if it became possible to test for the motion of Earth through such a continuous ether, then the principle of relativity would not hold for Earth, nor for electromagnets. If the velocity of light could be specified only with the conducting medium taken as at rest, whereby, in case you still want to know, it could be called the ‘absolute’ velocity of light—then it would be incorrect to measure light speeds relative to bodies which are themselves in motion relative to that conducting medium. ‘This consequence,’ to quote Northop, ‘also exhibited itself in the fact that electromagnetic laws for a given phenomenon took on a different and somewhat simpler form if observations were referred to the ether, than they did with any other Galilean or non-Galilean frame of reference.’”

“But of course,” Dug almost cried. “That’s just the point. Why complicate everything when reality is so much more simple? Why use arbitrary bodies for
reference when there is always a physical medium to show the correct answers? Why did they ever leave reality?”

“Because the ether-earth velocity test, which we have repeated here, came out negative. In spite of your yelling and screaming there was no measurable change in the velocity of light, regardless of the direction the earth moved relative to the non-existent ether.”

“Humbug. The experiment never was correctly done. They should have taken the instruments out into Galilean space, where we are going, then measured the velocity of light relative to the earth. They would have gotten interference patterns then, I’ll bet.” He grinned. “But instead of that they allowed their kinetic voids to go to their heads. They believed the nonsense about absolute and static ether, and they very apishly made sure that the ether was perfectly at rest to the instruments before testing for its speed. Hum de humbug.”

I decided to humor him. “Suppose they had done that,” I asked him, “What would they have found the earth’s velocity to be?”

He grinned a face-splitting grimace as he replied, “That would have depended on just where they decided their non-existent Galilean space is. As you found out yourself, there is no such place, so the speed of the earth relative to the ether would vary with the final position of the instruments, since the ether is in all kinds of motions relative to itself. Look to the mathematics of relativity of Einstein for the final mathematical answers. They are there, but so hidden beneath faulty theories as to be temporarily beyond interpretive understanding. Will you please get on with your presentation so that we can get into this theory eventually!”

Taken aback by the vehemence of his last, I returned to reading from Northrop: “Consider the situation in which the scientists found themselves. The equations of Maxwell, which have behind them an amount of exact knowledge and experimental verification so great as to make their rejection impossible, necessitated an experimental finding which does not exist. The only alternative was to modify the equations of Maxwell and Lorentz in such a way that they hold for traditional knowledge and give rise to the negative result of the Michelson and Morley experiment also. But how was this to be done?

“The first attempt at a solution of the problem was offered independently by Fitzgerald and Lorentz, It is known as the Lorentz-Fitzgerald Contraction Hypothesis. It is specified therein that a body, as it moves through the ether, contracts in the direction of motion according to a certain formula.”

I stopped reading only long enough to say to Duggie that I hadn’t forgotten that the contraction was devised to fit the unproven prior assumption that the light really did vary in velocity, wherefore the experimental test results were denied. Then I went on.

“This formula is so defined that it introduces precisely the modification which is necessary to adjust Maxwell’s and Lorentz’s equations to the negative result of
the Michelson—Morley experiment. The formula is that the original length of the body is to its contracted length as

\[
\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}
\]

where \( v \) is the velocity of the body relative to the Galilean frame from which its velocity is measured and \( c \) is the velocity of light.”

I went on with Northrop: “It is to be noted that this met the immediate difficulties. One could accept the result of the M&M experiment, admit Maxwell’s equations and the existence of the ether, and explain our failure to detect our motion through the ether because nature capriciously produces a contraction which exactly compensates for the effect which the ether had been expected to reveal.”

I went on: “But on further consideration, this hypothesis did not appear to be quite so satisfactory. In the first place, it requires that all objects whether they are made of rubber or of steel should contract to precisely the same extent. Secondly, it followed, if such a contraction occurred in certain materials, that after effects in the form of strains should appear. Experiments did not reveal these strains. Thirdly, it was pointed out that there must be a contraction in time as well as in space. This led to a peculiar doctrine of ‘local times.’ Finally, it followed that a more refined experiment should be able to go beyond the contraction which nature has introduced and detect a residual motion which would reveal our velocity relatively to the ether.

“All this led Lorentz to a most unusual conclusion. He decided to retain all the traditional ideas and put Maxwell’s equations into such a form that no possible more refined experiment of any kind whatever should be able to detect the velocity of our earth relative to the ether. Note what the last part of this involves. It means that the principle of relativity for Galilean frames of reference holds for electromagnetics as well as for mechanics. For if no possible experiment on Earth can detect whether it is moving or at rest relatively to the ether then electromagnetics joins with mechanics on the doctrine that there is no privileged Galilean frame of reference.

“But Lorentz failed to see the full implication of this point. For he still retained his faith in the ether. This was one of the most peculiar conclusions in the whole history of science. It . . .”

“Most peculiar! Most! Science is chock full of ‘most peculiar’ conclusions,” shrieked Duggie. “That particular conclusion was one of the most sensible, as well as most peculiar. Depends on how you look at it. If it was based on the
logical demand for a wave-conducting medium, it was singularly sensible. If it
demanded that the medium be other than matter, then it was very peculiar.”

Wearily I went on reading: “When Maxwell’s equations were revised so that
this principle held for them, Lorentz possessed several equations termed the
Lorentzian transformation equations which enable one, who knows the time and
space values for a given phenomenon measured relatively to one Galilean frame
of reference, to determine the values for a different Galilean frame, when the
velocity of the second frame relatively to the first is known. Also, a certain
constant c, which stands for the speed of light, appeared in these transformation
equations, indicating that the velocity of light is the same for any Galilean frame
of reference. It remained for Einstein to discover the consequences and real
meaning of this jumble of fact and fiction. This brings us to the special theory of
relativity.”

“Beginner,” Duggie slowly and solemnly addressed me, “student and partner, I
want you to seriously consider, or at least bear in mind throughout the coming
arguments, the fact that the Lorentz transformation equations spring from the
denial of the physical results of the M&M experiment. Bear in mind that these
equations, which were set up to accord with the effects of an electromagnetic
ether, became the premise for the later theories that denied such an ether. Bear in
mind that the transformation equation is actually the pivotal key to the entire
mathematics of relativity. Indeed, in that it is only from these equations that c was
taken as a constant, and in that science considers the originator of these equations
as possessed of a mind capable of ‘one of the most peculiar conclusions in the
whole history of science,’ and in that the consequences of the consequential
theories-of-relativity went far beyond logical understanding or translation into
sensible language, and in that . . .”

“What are you driving at, Duggie? Finish that sentence before you reach
limbo.” “I was just pointing out that there are some very suspicious aspects to all
of the later theories of relativity physics.”

Duggie then went over to the desk-cabinet and turned down the lever that
controlled our gravitational field. “We shall stop here for a while,” he said, “while
we have a little talk. We shall have to go over a bit of the metaphysics beneath
mathematics, to see what it’s all about before we get into the logic of relativity.”

So there we were, floating free in the depths of space. Even the distant stars
stood breathlessly still to await developments.
As you know, the theories of classical physics had culminated in total incompatibility between prediction based on theory and evidence shown by experiment. Theory had predicted a result totally denied by the aforesaid Michelson—Morley experiment. On top of that puzzling result, there had developed at about that same time two more incompatible “laws.”

The principle of relativity of classical physics says that “If, relative to K (where k is an inertially moving Galilean coordinate system) K’ is a uniformly moving coordinate system devoid of rotation, then natural phenomena run their course with respect to K’ according to exactly the same general laws as with respect to K.” (Einstein)

A second principle of classical physics says that the speed of light is a constant in vacuo. There is powerful evidence in favor of both of these laws, but they appear to directly contradict one another.

For instance: If an electric bulb is at point A, and two people are at point B, nine miles away in a vacuum, and light travels at the constant speed of nine miles per hour, then it will take one hour for the light to reach the two people and it will have a speed of nine miles per hour to both.

If, however, one of the men starts from point B at three miles per hour toward the beam as the light leaves A, the light should still pass that man at nine miles per hour, and pass the second stationary man at nine miles per hour. A little
thought will convince the reader that this is physically impossible, and this impossibility plus the “failure” of the Michelson-Morley experiment to demonstrate the change in the speed of light according to its direction of propagation, led to the theory of relativity.

It was the purpose of that theory to show how these contradictions could be reconciled without suspending any of the laws.

“We are now going to subject the imaginary experiments of Einstein to some critical examination,” Duggie announced. “Let me read you the beginning experiment from which it was deduced that simultaneity is relative. You will remember that these three principles; (1) the principle of relativity for Galilean frames of reference, (2) the principle of the absolute velocity of light in vacuo, and (3) the principle of the relativity of simultaneity became the three premises of the special theory of relativity. The third of these principles was deduced? . . . from the first two.”

The Simultaneity of Simultaneity

Duggie picked up Einstein’s “Relativity,” Lawson translation, and said, “Says here on page 31 as the manner by which a logical denial of the constancy of time, and of absolute simultaneity, were obtained.” He read:

“We suppose a very long train traveling along the rails with the constant velocity $v$ and in the direction indicated in Figure 4-1. People traveling in this train will with advantage use the train as a reference body (coordinate system); they regard all events in reference to the train----.

![Figure 4-1](image)

Figure 4-1.

Are two events (the two strokes of lightning A and B) which are simultaneous with reference to the railway embankment also simultaneous relatively to the train? We shall show directly that the answer must be in the negative.
“When we say that the lightning strokes A and B are simultaneous with respect to the embankment, we mean: the rays of light emitted at the places A and B, where the lightning occurs, meet each other at the midpoint M of the length AB of the embankment. But the events A and B also correspond to the positions A and B on the traveling train. Let M’ be the midpoint of the distance A-B on the traveling train. Just when the flashes of light occur, as judged from the embankment, this point M’ naturally coincides with the point M, but it moves towards the right in the diagram with the velocity v of the train. If an observer sitting in the position M’ in the train did not possess this velocity, then he would remain permanently at M, and the light rays emitted by the flashes of A and B lightning would reach him simultaneously, i.e., they would meet just where he is situated. Now in reality (considering it with reference to the railway embankment) he is hastening towards the beam of light coming from B, whilst he is riding on ahead of the beam of light coming from A. Hence the observer will see the beam of light coming from B earlier than he will see that emitted from A. Observers who take the railway train as their reference body must therefore come to the conclusion that the lightning flash B took place earlier than the lightning flash A. We thus arrive at the important result:

“Events which are simultaneous with reference to the embankment are not simultaneous with respect to the train, and vice versa (relativity of simultaneity). Every reference body (coordinate system) has its own particular time; unless we are told the reference body to which the statement of time refers, there is no meaning in the statement of the time of an event.”

“There seems to be something odd about all this,” Duggie said. “What can be the meaning of a simultaneity that is, or isn’t, depending on who’s looking?”

“Only that unless the light brings you the information, you wouldn’t know what or when things happen. Bringing takes time,” I replied.

“Yes, but if light always travels at the same speed, and you know that speed, you can always correct for the time of transit so as to know when things really happened. We must go back away to find out what kind of ‘simultaneity’ is being discussed. Here,” he handed me the book. “The discussion about the definition of simultaneity occurs prior to the above quoted hypothetical lightning experiment. Find it and read it to our student.”

Flipping back a few pages, I read:

“We thus require a definition of simultaneity such that this definition supplies us with the method by means of which, in the present case, (one) can decide by experiment whether or not both the lightning strokes occurred simultaneously . . . By measuring along the rails, the connecting line AB should be measured up and an observer placed at the midpoint M of the distance AB. This observer should be supplied with an arrangement (two mirrors inclined at 90 degrees) which allows him visually to observe both places A and B at the same time. If the observer
perceives the two flashes of lightning at the same time, then they are simultaneous.

“See how foolish we are,” Duggie exclaimed. “We always thought that if two things happen at the same time they are simultaneous. Now we find that if we are blind, hence unable to ‘perceive’ when things happen, there can be no such thing as simultaneity. Oh greatest God of Humour, it now seems as though the ‘objective’ world of modern space and time is totally dependent for existence upon our sense of sight.”

I didn’t want Duggie to go off into another of his long diatribes so I said, “No. That was but a definition of a measuring rule of simultaneity. As a definition it didn’t have to be ‘true.’”

“That’s all very well,” he sniffed, “but if it was not true, then neither were any of the theories of relativity which came from it.”

“But what do you mean by ‘true.’”

“That it conforms with the reality of nature.”

“That’s all very well,” I threw his phrase right back at him, “but it was just demonstrated by the train-lightning experiment that there is no way to know whether things happen simultaneously or not, in nature.”

“With that definition of simultaneity it would appear that the experiment is a put-up job. The definition was created to produce the conclusion. The relativity of time was not discovered, it was invented.”

“As Northrop wrote: ‘He (Einstein) proceeded to examine traditional theory and (to) note what presupposition makes the two principles (relativity and absolute light velocity) contradict each other. He discovered that it is the doctrine of the addition and subtraction of velocities, which rests upon the principle that time is absolute. Nothing remained but to reject the latter principle and regard time as relative. Thus, a contradiction in, traditional electromagnetic theory led Einstein to the discovery of the principle of the relativity of simultaneity. This is the essential contribution of the special theory of relativity.’

“You will note that the theories of electromagnetics were purely mathematical, and that the proceeding by which the two mathematical principles were supposed to be reconciled rests upon a denial of the principles of the most basic mathematics of all, arithmetic. That was the beginning of the construction of the paradoxical theories of modern science. Einstein’s definition and the experiment were both created specifically to ‘prove’ his perfectly arbitrary prior decision that time is relative.

“They, therefore, are subject to grave doubts, as to validity. The ‘conclusions’ drawn from the logic of the hypothetical experiment existed in advance of the experiment, and were then generalized to apply to all definitions of simultaneity.”
“Now we are ready to perform our own experiments,” Duggie said. “Now you will see what our student has been doing, while he was away from us. He went on ahead to prepare the ‘apparatus.’ There is a long train, running on a set of tracks which are cogged to it, and it has an observing instrument (televising) at its midpoint with another similar instrument at a point on the track which will correspond with that of midpoint M of the train when the lightning hits. We shall enact Einstein’s experiment. But you will note that we make no advance stipulation of whether the track or the train is fixed to an ‘embankment.’ You will also note, since action equals reaction, that there is no way for us to stipulate whether the track moves past the wheel cogs of the train, or the train moves down the track.

“For this experiment we shall assume that there is a void out here in the depths of space.”

I looked out through the observation wall-window, and sure enough there I saw an immensely long train puffing away on a track floating free in space. Weird.

The student spoke. “I have arranged our signaling instruments so that we need not worry about time of transit of the reports to our television set.

“Excellently done,” Duggie complimented him. “Start the experiment.”

I watched the screen with one eye, and the train with the other (I was temporarily cross-eyed). The train and track slid along each other very smoothly, and just as the instrument at midpoint M reached the similar instrument on the track, two lightning bolts hit the ends of the train. I looked at the screen to see the reports, expecting that to the track instrument the flashes would appear simultaneous, while the train instrument would report non-simultaneity. Or vice versa.

Both instruments reported that the bolts hit simultaneously!

“But that’s impossible!” I protested. “The screen and experiment must have been rigged.”

The student and Duggie rolled hysterically on the floor, hugging and pounding each other, and laughing fit to kill. What nonsense. When they had recovered their sanity, Duggie said, “See what happens when we apply the conclusions of relativity to its premises? You forgot relativity. It says that the speed of light is always a constant, regardless of the frame of reference or the state of motion of the light source.

“Now, we do not have the unspoken preconception that the track ‘really’ was at rest, so we can apply relativistic conclusions to what should have happened. According to the doctrine of shrinking lengths and times, and constant speeds of light, the light must have reached both instruments at the same time regardless of how they moved. Their velocities would cause just the right time-space compensations to make the results come out the same.”
If the train were in motion then space values must decrease in the direction of motion according to the Lorentz Contraction Hypothesis, as well as the Lorentz Transformation equation of the theory of relativity. The two lights would therefore reach midpoint M simultaneously, as follows:

1. In relativity theory light is always the (unadmitted) source of reference as to value of space-time units.

2. The train would be approaching one light and moving away from the other. Hence (from 1 above) the dimensions would have shrunken on the one side and lengthened on the other.

3. Whether the train, the track, or neither were at rest, according to the conclusions of the theories of relativity, the relative space-time variations would always be such as to yield simultaneous arrival of the two lights at midpoint M or M’. Indeed, it is this very conclusion which the theory of relativity set out to reach in its attempt to explain the “failure” of the Michelson-Morley test for variations in differently directed light speeds. But Einstein can’t have both his cake and its eating. He can’t use a constant time and length only long enough to conclude from them that simultaneity is relative, then use the “relativity of simultaneity” to prove that time and space are not constant! Either space does not shrink (whatever “shrinking space” might physically mean) or simultaneity is not relative.

Chapter 5

Enacting Einstein’s “Experiments”

I recognized that the last experiment couldn’t have worked as it did unless the relativity theory was right, i.e., space shrinks in the direction of faster motion. But if it was right, then the experiment still couldn’t have worked, since it proved relativity’s premise wrong.

I asked them how come the experiment came out at all, whereupon they laughingly admitted that the experiment had been juryrigged altogether. “That experiment was an impossibility for more than one reason,” Duggie told me. “The biggest reason of all is that the speed of light in vacuo is not only not absolute, it could never happen. Light can’t traverse a void.”

“Well, how come relativity worked, if it couldn’t even happen,” I asked.

He replied, “Come, Let’s try another experiment. I wonder how that last experimental ‘conclusion’—the relativity of simultaneity—would hold up against some other definitions taken from the same book by Einstein. I read: (1) ‘... we understand by the “time” of an event the reading (position of the hands) of that one of these clocks which is in the vicinity (in space) of the event.’ or (2) ‘When two clocks arranged at rest in different places of a reference body are set in such a manner that a particular position of the pointers of the one clock is simultaneous with the same position of the pointers of the second clock, then identical “settings” are always simultaneous.’”

Duggie set down the book. He and the student, whose name was Glird, went into a huddle. They whispered to each other, chuckling and giggling, till I began to wonder what they were cooking up for me now. Duggie finally came back and
told me that Glird was going to leave us again to prepare some other, later experiments. This time Glird just disappeared, en massless.

When I looked out our wall-window I saw that the train and its track were still there. As I examined the train in mild curiosity I suddenly spied someone moving about on it. It was Glird! He had on some kind of space suit, with a huge, clear globe over his head.

“What’s Glird doing out there?”

Duggie came over to watch, and then told me that Glird was merely setting some “simultaneous clocks” into several positions to prepare us for our little experiment before going off to get ready for some later ones.

“He went out of here with four clocks,” Duggie said. “The clocks are all perfect time-pieces and we carefully set them to the exact same readings. He is going to place one clock at each end of the train, and one at point M of the track. The last one will be placed at mid-point M’ on the train. We hold the track at rest and start the train rolling from a position where the two midpoint instruments are not at the same place, but just as they are opposite each other we shall call down the lightning. We shall have the lightning strike the two clocks at the train ends, which shall occur just as the midpoints M & M’ are identical for the train and track, and we shall allow the light to travel at a constant speed in both directions. When the lights are seen by the midpoint instruments they shall record the times of arrival of the lights. After the experiment we shall gather up our equipment to see what happened.

“With respect to Einstein’s quoted definition of the time of an event let us recapitulate what our experiment is to do:

“First we define simultaneity as that word which means that things happen at the same time,’ where the time depends on two synchronized clocks, or more, placed one each at the site of each event considered (a la Einstein). In this definition things may occur simultaneously even in the dark. Let’s apply this definition to the train lightning experiment.

“We again have ‘the very long train traveling along the rails with the constant velocity v and in the direction indicated in Figure 4-1. Again we have points A and B as before, with midpoints M and M’, and again the lightning strikes points A and B. We have set up the same situation, except that now we add some ‘simultaneous’ clocks to the picture. We set one clock at each of the points A, B, M, and M’. We specify that the two lightning bolts strike clocks A and B so that they stop ticking at the instant the lightning strikes.

“We now specify that the lightning strikes points A and B simultaneously. This means that clocks A and B are stricken dead at the same ‘time,’ as will easily be demonstrated by looking at them.” (You will note that with a more natural definition of “simultaneity” we need not specify relative to what reference body simultaneous means “at the same time.”)
“We now specify that according to the previously quoted experiment the man at point M’ of the train will “see the two flashes at different instants, and will judge that they were not hit at the same time, according to his clock at M’.

Clocks A and B are moving with the train so it can make no difference to the result whether the man on the train falsely decides that the moving train is at rest.”

The experiment was uneventfully run off.

We gathered up the clocks and instruments for examination. This is what we found: 1. The two end clocks had stopped at the same instant, as indicated by the simultaneous readings of their pointers. 2. The clock at midpoint M of the track had stopped at a time just sufficiently later to account for the time-in-transit of the light, and the instrument here reported that the two lights had arrived simultaneously. 3. The clock at midpoint M’ of the moving train had stopped at a time-reading slightly before that of the track clock, though after the time that the lightning hit the end clocks. The instrument there reported that the two lights had arrived at different instants.

(Glir did not set two circuit connectors at either end of the train, with two switches on the track so situated that they made contact with the two ends of the train just at the instant when midpoint of the train and midpoint of the track coincided. In that way the two lights were started simultaneously, as two switches connected track to train.)

“What do these results tell you?” asked my partner.

“First of all, they show by the readings of the two clocks at the points where the events happened, that the lightning hit simultaneously.”

“That is correct,” he said. “The simultaneity of two events has nothing to do with either the track, the train, or the speed of light, but depends strictly upon the time the two events occur.”

“Secondly, since the two events happened simultaneously, as shown by pointer readings of a properly situated set of pointers, it follows that the instrument at the midpoint of the track was at the middle between the two flashes, and was at rest.”
“How so?” Well we knew in advance that when the lights first hit the end clocks, they were equidistant from point M on the track. The instrument at point M tells us that the lights reached it from either end at the same time. Further, said clock stopped just sufficiently after the end clocks to allow for both lights to have traveled to that midpoint, if light travels at the same absolute velocity in both directions. Since the midpoint of the track was equidistant from the flashes when they simultaneously occurred, and since the flashes reached it at the same time, after the required lapse of time for transit of the two lights, it follows that the track had to have been at rest.” “Excellent. What else?”

“Finally, we find that the train-riding clock stopped just before that of the track clock. The pointers tell us that. In order for the train clock to have stopped sooner, then it must have been hit by at least one of the lights sooner. If the train were at rest, and the lights hit its equidistant ends simultaneously, (as shown by the train’s own end clocks) and the lights reached the middle of the train in a shorter time that it takes light to go that far, then the speed of light is not a constant. But if the speed of light is a constant, and does not arrive from either end at the same time even though it is known that they started simultaneously, it follows that the train had to have been in motion.”

“There you are,” Duggie exclaimed. “If light speed is taken as absolute, then the principle of relativity is in error, and so is the relativity of simultaneity.

“There is something else our instruments recorded for you,” he continued. “The arcs were both white lights, and the instruments recorded the color of the light as it reached them. They photographed it in color. Look.” He handed me several labeled pictures. The ones from the instrument at rest at the midpoint of the track showed white lights. The ones from the train midpoint showed lights of two different colors because of the Doppler effect.

“You see,” he said. “Even the color of the light tells us that the train really was in motion. You should now understand that the light is conducted by the medium which fills the so-called ‘vacuum’ of the experiment. The light travels at a constant speed relative to that medium, and in this experiment the medium is the ether which is at rest to the track rather than to the moving train. That medium is the only absolute referent for light speed, wherefore both the principle of the absolute velocity of light in vacuo (regardless of choice of coordinates), and the principle of the relativity of simultaneity are equally false.”

Again I pondered his statement before asking, “If it’s all false, then how come relativity mathematics made such accurate predictions?”

He repeated his previous assertion that the answer to that question remained for me to find. “I’ll give you the same hint as before,” he added. “All the rest of the logic of relativity is equally false, so the mathematics ends up with everything in correct relative position, but beyond understanding.”
The Relativity of Time

He paced up and down for a moment, then said, “Even if for the sake of argument we accept the ‘relativity of simultaneity,’ we still have no reason to accept the next deduction of relativity theory.”

He picked up Einstein’s book and started to read again:

“Now before the advent of the theory of relativity it had always tacitly been assumed in physics that the statement of the time of an event had an absolute significance, i.e., that it is independent of the state of motion of the body of reference. But we have just seen that this assumption is incompatible with the most natural definition of, simultaneity;... if we discard this assumption, then the conflict between the law of the propagation of light in vacuo and the principle of relativity disappears.

“... (previously) we concluded that the man in the carriage, who traverses the distance w per second relative to the carriage, traverses the same distance also with respect to the embankment in each second of time. But, according to the foregoing considerations, the time required by a particular event with respect to the embankment must not be considered equal to the duration of the same event as judged from the carriage (as reference body). Hence it cannot be contended that the man in walking travels the distance w relative to the railway line in a time which is equal to one second as judged from the embankment.”

Then he said, “I fail to see how the relativity of simultaneity has any bearing upon the duration of an event. ‘Simultaneity’ implies a point, or an instant, in time. Things that happen simultaneously happen at the same point in time, not over the same length of time. It is possible for one person to see two events occur over a period of ten seconds each, where they start and end simultaneously. It is also possible for another person, a train rider for instance, to see the same two events start and end at different instants (since he would not remain equidistant from them, or even in one position while they occur). But he would still see that each event took ten seconds to occur, if light speed is absolute. The simultaneity of two events has nothing to do with their duration!”

“According to ‘the most natural definition’ created by Einstein, the ‘simultaneity’ of two events doesn’t even have anything to do with when they occur,” I said. “It depends only on when they are seen.”

“Precisely!” Duggie exclaimed. “This makes relative simultaneity purely subjective! It has nothing to do with nature.”

“Wait a minute,” I said. “In the last account of a man walking through a moving carriage, you must admit that he would be approaching the front end light faster than the back end light approached him. An event happening in front of him would therefore appear to happen faster than would the same event if it happened
from behind. The light would pass him faster from in front than from behind. To him, then, the length (in time) of the events would actually vary.”

“The color of the events might vary, because of the Doppler effect,” Duggie argued, “but not the duration. Not unless the speed of light varies with the relative speeds of the observer. If the absolute velocity of light is a fact, then the light would pass any observer in the same length of time, regardless of his state of motion. Of course, since the relative velocity of light does vary with the body of reference arbitrarily chosen, your walking man would pass the front light faster than the back light passed him, wherefore the events would have different colors and different apparent durations with the direction he happened to turn his head.

“Of course, the only way that could happen would be that the light approached him faster from in front than from behind, whereupon the principle of the absolute velocity of light is again denied.”

He was too good for me to handle. Instead of trying to refute his arguments I asked him whether all the rest of relativity theory was also debatable and he said, “Let’s examine some more of it.” We were still sitting in our motionless lounge room, way out in Galilean space, as you may remember.

The Relativity of Gravitation

He picked up Einstein’s “Relativity” and began muttering to himself as he flipped through the pages. I overheard some of his rambling words. Somewhat like this:

“If physicists and scientists find their laws are unreasonable and decide to keep the words of the ‘law’ intact while changing the meanings of those words, I will consider them somewhat foolish (why not let the law say what it means?), but I will have to allow that it is one way to change a ‘law’ without admitting it.

“If the law says that such and such happens ‘simultaneously,’ and it really doesn’t, I guess it’s all right to say that ‘simultaneous’ really means ‘not at the same time.’

“If the law says that ‘when my student-partner throws a glass around, gravity will cause it to fall up,’ and when he tries it the glass falls down and breaks, I suppose it is scientifically all right to say that ‘up’ really means down, so as to maintain the words of the law. Does seem kind of silly though.
He found the place he was looking for, turned to me and said, “If the force of
gravity is considered as existing, we might define ‘down’ as the ‘direction in
which a body will fall when dropped from a position of rest relative to the
gravitating body.’” (It was fortunate that I had eavesdropped on him.)

I said to him, “That there is a force of gravity is partly denied by the theory of
relativity. Just a curvature of spoo-spap.”

He laughed, then began to read:
“We imagine a large portion of empty space, so far removed from stars and
other appreciable masses that we have before us approximately the conditions
required by the fundamental law of Galilei ---- /. As reference-body let us imagine
a spacious chest-- with an observer inside who is equipped with apparatus.
Gravitation naturally does not exist for this observer.”

Dug stopped reading. It was unnecessary for him to tell me that we were going
to re-enact the hypothetical experiment based on that introduction. After all, we
were out in that approximate Galilean space, we were in a chest-equivalent, and
as soon as Duggie turned off our field, we were gravitationless (nearly).

Duggie said, “This hypothetical chest is supposed to be suspended from a rope
God knows how long, at the other end of which some ‘being’ is hauling away
with a constant force.”

I bet our student has been busy,” I hinted.

Duggie smiled, nodded and said, “It says here (‘Relativity’) something about a
‘being’ and adds, ‘what kind of being is immaterial to us.’ I will readily concede
that this being must be immaterial, since he will ultimately find that the chest is
going at light speed. Relativity conclusions say that nothing can go faster than
that, so, if our being is to continue to apply a constant acceleration force to us he
would soon require an increasingly infinite amount of strength.

“As you have guessed,” he added, “we must use a material being, Glird, as our
Genie. He has attached a rope to our room, and will soon begin to apply a
constant force to it. As you know, in order for the applied force to remain
constant, though we accelerate all the time, it requires a steadily faster application
at his end. He has an accelerating winch operating, and we have suspended the
law of action-reaction so that he remains where he is.”

I read through Einstein’s experiment again, and found that after describing the
conditions of it, where the rope begins to draw up the chest.

“The chest together with the observer then begin to move ‘upward’ with a
uniformly accelerated motion. --- The acceleration of the chest will be transmitted
to him (the man in the chest) by the reaction of the floor of the chest. He is then
standing in the chest in exactly the same way as anyone stands in a room in a
house on our earth. If he releases a body which he previously had in his hand, the acceleration of the chest will no longer be transmitted to this body, and for this reason the body will approach the floor of the chest with an accelerated relative motion. The observer will further convince himself that the acceleration of the body towards the floor of the chest is always of the same magnitude, whatever kind of body he may happen to use for the experiment.

Relying on his knowledge of the gravitational field, the man in the chest will thus come to the conclusion that he and the chest are in a gravitational field which is constant with regard to time.”

After I finished reading that to Duggie, he soberly spoke. “Well, we already registered an objection relative to the nature of the immaterial being. We can follow up this objection a bit more seriously by pointing out a number of flaws in the logic of this ‘experiment.’

Objection 1. The experiment has assumed that there is such a thing as instantaneous action at a distance.

Objection 2. The experiment fails to apply the conclusions, or even the premises, of relativity theory. It ignores the maximum speed of light, and other signal transmissions, and it ignores the theory that the mass of the chest increases with its acceleration-of-velocity.

Objection 3. ---but never mind. We shall see what happens for ourselves. The time has come.”

He threw the lever into “off” position, and as I looked at the floor to see whether anything was happening, the reaction of my feet bracing against the floor set me floating weightlessly around the room. As I bounced off the ceiling and began to approach the floor again Duggie yelled, “Hold on! When you reach the floor, hold on to something because Glird is going to apply a force to us any second now.”

I had scarcely gotten myself into a position where I floated over a chair when the chair came up and sat under me. Glird was operating! I sat there for about five minutes, waiting for something to happen, but nothing did. For all practical purposes we seemed to be at rest. When I stood up, even my weight felt normal. I picked up a few objects. They felt of normal weight too. I dropped some of them. They fell.

“What do you know.” I exclaimed in some surprise. “Einstein was right this time. Even you can’t say that we couldn’t just as easily be at rest in a room on earth.”

“Wait,” was the answer. “Glird is applying a constant force just sufficient to accelerate us at 32 feet per second per second. All seems earth-normal, ---now. But Einstein forgot time. Of all things! Wait.” So I waited.

Several days passed, during which time I ate, slept, listened to musical records, read, and occasionally said to Duggie, “Well?”
He always answered, “Wait.” I waited.
After a few more days I began to feel a strange lightness. When I stood up I seemed almost to float. The objects I lifted all seemed to be growing lighter. I thought I was getting sick, and asked Duggie for some aspirins. “What’s the matter?” he asked superciliously.
“I seem to be afflicted with some kind of lightheadedness or something,” I complained. That cruel person laughed!
“Oh great preconception-filled partner,” he piped, “has it not entered your lightheaded head that our ‘gravitational field’ is growing weaker?”
“Oh great fake-experiment of a partner,” I said. I was slightly disgusted with this second rigged experiment. “There you go, fouling up the works again. Is this what we’ve been waiting’ for? For Glird to stop applying the constant force?” What they wouldn’t do for a laugh. Any second now I expected to see Glird rolling hysterically around on the floor.
“Why partner. What a suspicious mind you have. We didn’t change anything. You just forgot to apply the conclusions of the theory of relativity to this experiment. You forgot that as the velocity increases so does the mass. In order to have maintained a constant rate of acceleration, therefore, Glird would have had to apply a steadily increasing force, not a constant one. We have just slowed our rate of acceleration as we got heavier, that’s all. As we do, though, everything seems to get lighter. As we approach the speed of light, we—”

!!!!!!  !!  !!!!  !!!

“Where am I? What happened? Where are you, Duggie? Where’s the lounge?” These unspoken questions flashed through my mind as everything suddenly disappeared. I went to look down at myself, to see if I too was gone, but there were no eyes to look with. Even in that bewildering moment of sudden calamity my penetrating mind took time to figure out that if my eyes were gone, so was I.
I existed, alone and nowhere, for perhaps two minutes before the lights came on again and I saw myself still in the lounge with Duggie. Glird was with us again.
“Did you do that?” I accused him.
“He didn’t do it intentionally,” Duggie said. “He just lost one second’s timing in his applied force. We accelerated up to the speed of light, and, as relativity says, at that speed our lengths in the direction of motion shrank down to zero. According to relativity we were slowly shrinking all along, but since everything shrank in exact proportion, we never noticed anything until the instant we shrank down to no length. Then we just disappeared.
“Limbo-schlimbo,” I replied. “You missed the whole point of relativity. Sure, as our mass increased the acceleration would slow. But the slowdown would be exactly proportionate to the increased mass, wherefore our “weight” would have
remained constant in that experiment. You rigged the whole thing.” “True,” he admitted. “All true. But as the absolute mass increased with the absolute speed, while the accelerative rate decreased, several consequences would develop. First, the rate at which things “fall” would slow-in harmony with the decreased accelerative rate. This contradicts the actions of gravity, which remains constant. Second, although the weight might appear to remain constant to your measuring devices, the inertial mass, indeed the mass itself, increases. The absolute mass is independent of your measuring instruments. So all tests of inertial activities would show that actions were slower. If you tried to jump up, you would find that it took a lot more strength . . . to throw a ball would take increasing energy, . . .”

“Hah!” I triumphantly interrupted, “you forgot relativity again. That’s just the point. As actions slowed with the increasing mass and as the so-called rate of fall slowed with the decreased acceleration—all such changes of rate would be exactly proportionate to the changes of mass in response to the approach to the speed of light. And those changes of rate are exactly compensated by Einstein’s changes in the value of units of time, so space-time events are exactly the same to the men in the chest all along. Even though they aren’t.”

Duggie chuckled to himself for a moment. “Even though they aren’t,” he mused. “But that’s just the point of our objections. Sure,” he said. “Rates do slow. Chemical reactions might slow accordingly, or even strengthen appropriately. Tests for inertia might be compensated by rate decreases of the apparatus, as well as of the perceptive faculties of the experimentalists. But to equate a change of rate with a change in time values is not a conclusion drawn from any experimental or scientific arguments. It is a perfectly arbitrary decision.”

“What do you mean arbitrary?” I asked. He replied, “Time is a dimension. Dimensions are inventions of the intellect. The value of a unit of measurement is appointed by arbitrary choice, not because such units objectively exist. The units may be established as ideally constant, or they may be appointed as variable. It is a free choice. But never mistake that arbitrary choice with a fact of nature, Buddyboy. Your changes of rate have nothing whatever to do with the value of time units. Rate changes and time changes are not synonymous, as Einstein would have you believe. Indeed, rate changes become measurable only through comparison against constant measuring units.

“But enough debating. If Einstein’s conclusions are inaccurate, then we should be able to demonstrate that fact. Let’s experiment.”

He then checked to see that our lounge was at rest with respect to the vault of stars in heaven before pointing out a very long, narrow passageway that extended up through the ceiling. “See that hole up there,” he said. “It is a very long passageway that has several clocks perched up at the top of it. They are all running at the same rate, and are set at simultaneous readings with the clock here on the shock-absorbing floor. Now, we’re going to let Glird accelerate us again
with a constant force. Again our mass will increase as we approach light speed, but rates will slow compensatorily. As we begin to approach meaningful proportions of light-speed, I shall release the clocks one by one. We shall see what happens to time, or to timepieces at any rate, when this is done.”

Well, all this was done. Here are the results:

At moment 1, clock No. 1 was dislodged. Its acceleration stopped. The rate at which its mechanism kept time stopped decreasing. The clock on the floor of the lounge continued accelerating, and its time still continuously slowed. Accordingly, when clock 1 reached the floor it was running faster than the floor clock. Of course, as soon as the floor again accelerated clock 1 to the same speed as the floor clock, clock 1’s rate returned to “normal.” But although it now kept the same time as the floor clock, it had a slightly different time on it. Slightly ahead. Clock No. 2 similarly altered its recorded time, although it too returned to normal as the floor rapidly accelerated it back to the same speed as the lounge. While clock 2 was “falling,” it maintained a constant rate as compared to the decreasing rate of the floor clock, but it ran at a slower rate than clock 1 had kept while it (clock 1) fell. However, since the rate of fall decreased with the decreased acceleration, the interval of fall would exactly balance the different rates clocks 1 and 2 held while falling so that clock 2 would have become exactly the same degree ahead of the floor clock when it came to “rest” as had clock 1. Conclusion: The amount of difference in recorded time is dependent upon the rate of acceleration, but independent of the attained velocity at any given moment. Further, while the amount of difference depends upon the rate of acceleration, it is independent of any changes in acceleration that are part of space-time alterations due to speed-of-light Relativities.

We discussed results of a similar experiment in which the lounge might really have been at rest in a gravitational field, and the clocks might have been dropped down the passageway. Our conclusion was that as the clocks accelerated downward, Relativity would have had their masses increase, while for them time slowed down. Accordingly, when they reached the floor they would register a time slightly behind that of the floor clock. At the moment of hitting the floor, in either experiment, these shakeproof watches would be “accelerated” very rapidly, and their rates would rapidly change. But in either case the changes would be to the limit imposed by the rate of the floor clock, so that in neither event could they recover the difference in time indicated at the moment of contact.

“You must see from all of this that there is a great difference between clocks dropped in a stationary system within a gravitational field, and clocks dislodged from an accelerating system in a non-gravitational field. Absolute motion plays its role. The accelerative field clocks end up ahead of the floor clocks, while the gravitational field clocks end up behind the time of the floor clocks.” Duggie had made his point.
The abram of the dropped clock increased as it was accelerated by gravity. Accordingly, its rate slowed. It is possible that relativists might now claim that this slowdown was caused by the fact that the strength of the field increases with the approach to the source, and that the clock slowdown confirms Einstein’s later claims. Indeed, if they are Harvard experts they might even work out the arithmetic for it. But how would they then explain the “speed-up” of the clocks “dropped” in an accelerating space ship?

It is even possible for a hidebound, stubbornly unreasonable relativist to continue with the claim that since gravity does increase with the approach to its source, the speed-ups and/or slowdowns would not be definitive since clocks at different altitudes would keep different time anyway.

To this argument we need but reply that here is yet another proof that Einstein was wrong. In a gravity field, clock 2 would initially run slightly faster than clock 1, yes. (It is higher, Gravity is weaker there. Mechanics goes faster in weaker fields, says relativity.) But in the accelerating space ship—which Einstein et al aver is precisely equivalent to the stationary-in-a-field one—there is no such differential prior to the drop. Hence, both clocks would maintain constant time measurements in the accelerating chamber while they would NOT do so in the gravitational chamber, before being dropped.

No matter how you invert, twist, or reverse it, there is a real and physical difference between gravity and acceleration.

The only way the relativist might now maintain his irrationally mathematical point of view would be to change the meanings of the words used, to ad hoc his posteriori, reverse his priorities and agree on ever stranger and more sense-denying postulates. OK for mathematics, which finds irrational results normal. But abnormal and ridiculous if you’re looking to understand nature.

At every point Duggie and Glird had shown that the deductions taken from the hypothetical man-in-the-chest experiment were untenable. The first, second and third deductions which led to the theory of relativity were now shown to be false!

**Einstein Errs**

There is another set of deductions to be taken from the man-in-the-genii-powered-chest experiment of Einstein. Let us suppose such a chest. Let it be accelerated upward at a constant rate by virtue of a constant applied force. Let there be some people in it, with suitable apparatus so that they do perform several experiments with various objects, to see how they react when dropped.
When the chest begins to accelerate upward, the floor of the chest will transmit its acceleration through the feet of the enclosed people so that they will move with it, while feeling “weight.” If they hold an object in their hand, the acceleration of the chest will be transmitted to that object, and it too will appear to have weight. If they let go of the object the acceleration will no longer be transmitted to it, and the floor of the chest will move up at an accelerating rate, relative to the object.

Is it true that every experiment, no matter what kind of body is dropped, will yield a uniform rate of acceleration between the body and the chest floor? Einstein says, “Yes.” He uses that yes as “a powerful argument in favor of the general principle of relativity.” Since the true answer is “No!”, it may be taken that here we find a “powerful argument” against the validity of the general principle of relativity.

To deduce the “no” all we have to do is use one of the simplest laws of physics and apply it to a consideration of the actions of chest and dropped objects under the constant accelerative force postulated by Einstein. The law is:

\[ f = ma \]

where \( f \) is the force, \( m \) is the mass, and \( a \) is the acceleration.

We were given the fact that the applied force is constant upon the chest. The erroneous preconception to the “yes” of Einstein is that the rate of acceleration of the chest would also be constant, regardless of dropped objects.

The mass of the chest plus everything in that chest represents the total mass being accelerated by the constant force of the genie. So long as everything in the chest is under acceleration the accelerative rate will be constant. But just as soon as some body is dropped, whereupon it is no longer being accelerated, there will be that much less mass under acceleration by the constant force.

Substituting into the above simple equation, we would find that the rate of acceleration of the chest would increase every time an object is dropped. We would further find that the amount of increase of that acceleration would vary proportionately to the weight of the dropped object. Further, if an object of, say, 100 lbs. was dropped, its rate of “fall” measured, then dropped again simultaneously with a second heavy weight, then we would find that the rate at which the 100 lb. object falls depends on whether it is dropped alone or in harmony with another object or objects.

Relying on a knowledge of how a gravitational field works, a knowledge which Einstein assures us he possesses (on page 32), the observer in the chest would be forced to conclude that since the objects in his chest do not fall at the same rate of acceleration regardless of mass, as demonstrated by simple experiments performed strictly within the confines of the chest itself, he must
have been under a constant acceleration in a non-gravitational field. His experiments would lead to the conclusion either that there is no equivalence between gravitational and inertial mass, or that the general principle of relativity is not true. In any event the general theory of relativity, the denial that gravity is actually a force, the statement that gravitational and inertial mass are merely points of view based on different choice of geometrical frames of reference are as logically wrong as they are self-evidently impossible.

Data Regarding Dropped Objects

\[ f = ma \quad \text{or} \quad a = \frac{f}{m} \]

where \( f = 600 \text{ ft lb/sec}^2 \) and \( a = \frac{600 \text{ ft lb sec/sec}}{600 \text{ lb}} = 1 \text{ ft/sec/sec} \)

<table>
<thead>
<tr>
<th>Mass</th>
<th>lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest</td>
<td>100</td>
</tr>
<tr>
<td>Two people</td>
<td>300</td>
</tr>
<tr>
<td>Block</td>
<td>20</td>
</tr>
<tr>
<td>Cube</td>
<td>40</td>
</tr>
<tr>
<td>Cylinder</td>
<td>50</td>
</tr>
<tr>
<td>Sphere</td>
<td>80</td>
</tr>
<tr>
<td>Apparatus</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total mass</strong></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

1. The chest plus all contents would thus accelerate at 1 foot per second² before anything were dropped.

2. If the cube were dropped, the remaining mass being accelerated would be 560 lb, the rate of acceleration would then be

\[ a = \frac{600 \text{ ft lb sec/sec}}{560 \text{ lb}} = 1 + \frac{2}{28} \text{ ft per sec}^2 \]
3. If the cylinder were dropped the remaining accelerating mass is 550 lb

\[ a = \frac{600 \text{ ft lb sec/sec}}{550 \text{ lb}} = 1 + \frac{2}{22} \text{ ft per sec}^2 \]

4. The sphere would leave an accelerating mass of 520 lb

\[ a = \frac{600}{520} = 1 + \frac{2}{13} \text{ ft/sec}^2 \]

5. If the cube were dropped (as in 2 above) and the block were dropped at the same time the rate of acceleration would be \(1 + \frac{1}{9} \text{ ft/sec}^2\). The cube and the block would now fall at a different rate than did the cube, alone, before.

6. If the cylinder were dropped, and while it was “falling” the block were dropped, and the rate of fall of the two were measured it would follow that: When the cylinder were dropped the rate of acceleration of the chest would increase to \(1 + \frac{1}{11} \text{ ft/sec}^2\) (see 3 above). The cylinder would thus start to “fall” with an acceleration of \(1 + \frac{1}{11}\). When the block was dropped, the rate of acceleration of the remaining mass of the chest plus genii-accelerated contents would increase accordingly, hence the rate of acceleration would again increase. Hence, the rate of fall of the cylinder would suddenly increase to a new constant, which would now measure the same as that of the “falling” block. When the cylinder hit the floor, however, (ignoring momentum) the rate of fall of the block would show a sudden decrease in rate of acceleration.

Relying on even the most rudimentary knowledge of the actions of masses in gravitational fields, our experimenters would have no sensible choice but to admit that they could by no stretch of anything but their rope be under the influence of such a field. They would be forced to agree that they were under a constant force of acceleration. By suitable, simple calculations based on their measured experiments they could even deduce the constant force’s magnitude as well as their own rate of acceleration.
Chapter 6

More Illusions

We still floated in the depths of space, far from any star. We had finished our man-chest test, and stopped our acceleration and velocity. We were at rest relative to the fixed stars.

Duggie had been reading Einstein’s presentation of the manner by which the relativity theory had been deduced, and we had been acting out the presented experiments, one by one. So far we had found them filled with flaws. Duggie looked up from the book and said, “Suppose, it says, we have a reference body in Galilean space—that’s us-. Suppose another reference body, disc shaped, is also present. Suppose the disc is rotating on its axis. An observer sits on its center. (We’ll send Glird.)

“The Galilean body, it says, also has an observer, and he knows no gravitational field exists.” Duggie went and shut off our internal field, then continued, “The man on the disc is allowed to wander away from its center, whereupon he will feel the effects of the rotation as centrifugal force. Einstein grants him the right to consider the disc at rest in order to allow him to call centrifugal force ‘gravity.’”

Duggie brought me a standard American dictionary and asked me to look up “gravity.” Webster’s Universal dictionary said: “Grav’i-ty, n. 2. In physics, terrestrial gravitation; the force which draws everything toward the center of mass of the earth.” I read that to Dug.

“Oh great God-of-Meaningless-Words,” he sadly shook his head,

“how we have changed the meaning of ‘gravity.’ When it here speaks of a man situated on a whirling disc, and says that such a man is justified in considering the
disc ‘at rest,’ where the centrifugal force (inertia) is called ‘gravity,’ the meaning of the word has clearly been subverted.

“That gravity could increase proportionally with the distance from the center of the mass, and actually disappear as the center is approached, is contrary to the very spirit of the meaning of the word.”

I nodded, and added, “With this use of the word we would have to describe the center of gravity of a whirling disc as a circle existing somewhere outside of the disc altogether.”

“Clearly, when Einstein generalized his whirling disks into a law of ‘gravity,’ his law no longer referred to gravity at all. It had some other, more general something in view.”

“But, since the predictions made with that law are found accurate, there can be little doubt about its validity and worth,” I said. “It is a very important law, in some significant sense. Unfortunately, I don’t know just what it is that his law does refer to, since it is no longer gravity.”

For fear of misquoting, Duggie read further from “Relativity” as follows: “To start with, he (disc-rider) places one of two identically constructed clocks at the center of the circular disc, and the other on the edge of the disc, so that they are at rest relative to it. We now ask ourselves whether both clocks go at the same rate from the standpoint of the non-rotating Galilean reference body K. As judged from this body, the clock at the center of the disc has no velocity, whereas the clock at the edge of the disc is in motion relative to K in consequence of the rotation. According to the result obtained in section XII it follows that the latter clock goes at a rate permanently slower than that of the clock at the center of the circular disc, i.e., as observed from K. It is obvious that the same effect would be noted by an observer whom we will imagine sitting along side his clock at the center of the circular disc.”

He and Glird went into another conference. They soon separated, and began manipulating a bunch of controls. “Go look out the window” Glird said. I looked, and saw a large circular disc extruding from the top of the lounge. It quickly slid away, to float next to our room. Just a few feet distant. Glird took two simultaneous clocks, donned his space suit, and left us. I saw him float across the tiny infinitely deep chasm, to land safely on the disc. He and the disc began to slowly drift away from us, and as it went Glird scouted about on it, setting his clocks into position. When he was about a mile away, he stopped the disc for a moment, then started it to spinning.

There he sat, on the center of a whirling disc, while we sat in our stationary room in Galilean space. The experiment was set up.

We checked our inter-apparatus communications and found them perfect, so Dug told Glird to get out on the edge to see whether he had a gravity field. Glird objected. He said, “But I just came from your room, and I know that you are at
rest while my disc is spinning. I know that what I feel will be centrifugal inertia. No fair.”

That was true, so Dug had Glird stop the disc, relative to us, and made it into a rest frame of Galilean space also. Then he said, “Now, since everything is relative, we shall start our own room moving and control our rockets so that we travel around the disc in a huge circle. In that way it shall appear to Glird as though he sits on a stationary disc while we fly around him in a circle. Actually, if he took himself to be at rest before, and ignored the spinning vault of stars (a la relativity), then it must have appeared to him as though we were circling around him all along. It really should make no difference to the results, if the principle of relativity is correct.”

The results of this test are obvious. Glird felt no ‘gravity,’ nor centrifugal force when he started out to the edge before we began to circle him, and he felt none after we started moving. (Except for the slight attraction of the room to the disc.) His clocks, of course, kept the same time.

“What’s this?” Dug lifted an eyebrow. “It begins to seem as though the disc must really have been spinning for the experiment to be able to deny it. If the disc is really at rest, then the experiment doesn’t work. Let’s try it another way.”

We got ourselves back at rest, relative to the disc and hence to the fixed stars. This time we set the disc to rotating, and sure enough the outer clock slowed down. Glird boredly reported his ‘gravitational field’ had been created.

Then Dug started our motors again, and steered them so that we soon were flying around the disc at the same speed that it rotated. Relative to us, it was at rest again.

“We will now take ourselves to be at rest, wherefore our rocket jets will be assumed to have caused a motion of our local environment, leaving the disc unaffected. Since we are at rest, and the disc is at rest to us, there should now be neither inertial effects nor a change in rate of the clocks on the disc.” With that, Dug called up Glird. As you know, Glird had noted a change in rate of his clocks and ‘gravitational’ centrifugal forces acting when his disc was spun, before we started to circle him. There had been no change in the motion of the disc since we started circling it, and Glird was still allowed to consider himself and his disc at rest.

When we got ourselves at rest relative to him, and still took ourselves as a rest frame of inertial space, it followed that the clocks would also now be at rest, that there would now be no ‘gravitational’ field, and that there should no longer be any variations between the rates of his two clocks. We asked him about them and he answered, “My clocks still go at varied rates. Just because you started to fly around in space, don’t expect there to be any change in my gravitational field. I still have it.”
Dug turned triumphantly to me and spoke. “Here we are, at rest in Galilean space. There is no field here. That silly disc is also at rest. No field there either. No change in rate of clocks, mutually at rest in a gravitationless field. What do you suppose is the matter with Glird, for him to report such unexpected results as that?”

“His results are not unexpected,” I said. “His disc is still spinning regardless of whether he or we take it to be at rest or not. Inertial force still throws him centrifugally, and if you did but note it, we feel it also. That wall over there has become our ‘floor.’”

That was so. As soon as we started ‘our environment in motion’ we had felt a force pushing us toward the far wall. (Since we really followed a circular path around the disc, our own inertia threw us always toward the wall on the outside of the circle.)

Duggie looked chagrined at that observation, but his face soon assumed its normal gleaming good humor as he replied, “If we still take ourselves as at rest, which we are permitted to do by the principle of relativity, then we would have to assume that there is a field in the area, and that it comes from a body located on the other side of that wall. If there is a body attracting us in that direction, and we are at rest, then we must be hanging in a fixed position relative to it. Since the disc is at rest with us, it too must be hanging in that field. Call Glird and ask him whether he feels the gravitation.”

We called Glird and he told us that he felt the pull as soon as he moved in our direction, but that it disappeared at the center of his disc. He felt the “pull” in all directions, away from the center, but he felt it coming from all directions. Depending on which way he moved. It “pulled” him just as strongly away from us when he was on the away side as it did toward us when he was on the near side.

“You’re mistaken in your assumption that there is a gravitating body located on the other side of your wall,” he told us. “There is such a gravitating body, as we can plainly feel, but it is located in all directions around us.”

We kicked that around a bit, and concluded that the only way to maintain that odd view was to agree that we actually were suspended inside of an internally gravitating body, and that the disc was at the very center while we were at rest part way to one side. We felt the “pull” from the near side, and it overcame any “pulls” coming from the other parts.

“Fine,” Dug said, “now let’s test that conclusion. As we know, both our room and the disc are at rest, with the disc at the very center of the hollowgravitating globe. Let Glird move his disc over a little way and then come to rest again. When he does that he will no longer be at the center, and he will then feel the same gravitational affects as we do.”

So the disc moved over a bit, and we continued “at rest.” (In truth, we still flew around in a big circle, while the disc continued to rotate on its axis at a point
slightly away from the center of our circle. Relative to our hypothetical gravitating body, though, we remained in our fixed position, with our constant “gravitational pull,” while the disc now was at rest to it also. It should now have left center and Glird should note a pull coming only from the side toward which the disc had moved, relative to us.)

“No change,” Glird reported. “The field still exists as before, with me at the center. The clocks still run as before. No change at all.”

It took no great genius for us to conclude from all of this that the disc had to have been rotating on its axis in a gravitationless field, while we were traveling in a circle around it. From that it followed that the disc had to have been rotating all along, even when we had originally been “at rest in Galilean space.” It then followed that unless we change the meaning of inertia and gravity every time a new experiment is performed, the conclusion of relativity theory that inertial mass and gravitational mass are the same thing, where the arbitrary choice of frames of coordinates is the only difference, is wrong.

A properly chosen set of tests must always reveal whether the effects are gravitational or inertial. They are not the same thing.

As Duggie put it, “The experiments of Einstein were rigged. They only went far enough to ’prove’ his prior conclusions, and then were carefully stopped before they revealed the falsity of the proof.”

Glird put it thus, “Since gravitational and inertial mass are quantitatively proportionate to one another, though, the arithmetic always worked, in spite of the theoretical impossibilities.”

As I put it, “You have now demonstrated that every point of deduction in the development of the theory of relativity was false. You have shown that if the principle of relativity is upheld, light speed cannot be absolute. If light speed is held as absolute, then the principle of relativity must be false. In either event, the principle of the relativity of simultaneity is false anyway. And even were it true, the ‘length’ of a second would not be affected.

Indeed, you have demonstrated that not only is each separate point of relativity and its premises false, but that even were any one point of the chain “true,” the rest still must be wrong.

How, then, did the mathematics of relativity work?”

Duggie answered with this story.

“We ask ourselves how the theory of relativity can have reached proper conclusions despite erroneous procedures. We answer that the success depends on the fact that every single step of the logic is compensatorily exactly wrong, so that all the steps fit into relative place when put together. We shall give a brief example of how this can occur.
“Suppose physics has a law that says, “If an object takes off from earth but remains vertical as it ascends, then its feet will always point down and it will remain right side up.” Suppose, now, that a man takes off from earth, ascends vertically so that his feet ever point to earth, and flies to the moon. Suppose that when he gets there he finds a normal living room, furnished, in an empty house standing on the surface. Suppose that there is an open trap door in the ceiling and that it closes just after the man enters the room through it. Obviously, the man will find himself standing on his head, when he reaches the floor.

“The man knows of the aforementioned ‘law’ of physics, knows that he never flipped over on his way to the moon, and therefore concludes that he is really right side up. When he looks about the room, he sees a lamp resting on the floor. He picks it up and turns it over on its head, saying, Now the lamp and I are right side up.’ He goes about the room and everts every piece of furniture in it, saying each time, ‘Now it is right side up.’ When he has finished, he finds everything turned so that the bottom faces away from the floor of the room, so he decides that everything is now right side up except the room. So he turns over the room, without disturbing anything in it. (A geni helps him.) Now he finds that everything is in proper relative position to the room, and that everything is ‘right side up’ and he is happy. Except for one thing. Nothing will stay right side up on the floor of that room unless it is bolted in position. So the man decides that gravitational force and inertial motion are different views of the same essential phenomena, and may be chosen according to frames of reference. He decides that the room and everything in it are right side up on an orbiting, non-rotating moon which has no gravity field, and that inertial motion is responsible for the fact that everything tries to fly toward the ceiling.

“Neat, unbreakable, and totally false.”

Duggie picked up a diagram about the stars, looked and hummed at it, pruned his lips as he said, “Suppose we agree that there is gravity, and that it is a force. Then agree that centrifugal force is different than gravity. What would happen to the disc rider and his clocks?”

“Our experiments bear out that assumption,” I said. “Furthermore, our experiments show that the disc rider can tell by proper tests whether he is reacting to gravity or inertia. It follows that the disc must have been spinning on its center in Einstein’s experiment.”

“But if the disc really was spinning, as demonstrated by tests performed directly on it, then you have just given an example of absolute motion! Einstein, et al, deny that there is such a thing.”

True. Modern science does deny that there is absolute motion of an object. Nevertheless, if the disc really had been at rest in Einstein’s experiment, while the Galilean body was spinning weightlessly around it in the absence of a
gravitational field, then the disc-clocks would have been at rest too. In that event
the clocks on the disc would have kept the same time! The only way it was
possible to conclude that absolute motion and absolute gravity do not exist was to
start with the premise that they really do! Einstein, perhaps unwittingly, used
absolute motion in order to construct the hypothetical experiment to deny its
existence. “Paradox and Parody.” His clocks absolutely did not keep the same
time.

“What came of the disc experipothesis?” I asked Dug.

He picked up the book “Relativity” and read,

“If the Galilean observer applies his standard measuring-rod (a rod which is
short as compared with the radius of the disc) tangentially to the edge of the disc,
then, as judged from the Galilean system, the length of the rod will be less than 1,
since, according to Section XI 1, moving bodies suffer a shortening in the
direction of the motion. On the other hand, the measuring-rod will not experience
a shortening in length, as judged from K, if it is applied in the direction of the
radius. If, then, the observer first measure the circumference of the disc with his
measuring rod, and then the diameter of the disc, on dividing the one by the other
he will not obtain as quotient the familiar number $\pi = 3.14...$ but a larger
number, whereas of course, for a disc which is at rest with respect to K, this
operation would yield $\pi$ exactly.”

Dug stopped reading and informed me that Einstein was using this to show that
Euclidean geometry does not conform to nature, and is not “true.” Then he
lectured me.

“Inconsistency: If an object shrinks in the direction of motion, and the disc is
spinning, then the disc must also shrink, as seen by the diagram. It would shrink,
laterally, so that each part of it shrunk in proportion to the local speed. Since the
local speed of each point of the spinning disc would decrease as one approached
the center, the disc would shrink proportionately throughout, and the diameter
would actually be less than when the disc was at rest, as would the circumference.
This poses us a problem: Sections 1, 2, etc., are each moving just as though they
were measuring rods, so, must also shrink. Even as they shrink, a straight line
would remain straight.
The disc is \( \pi \) units of measuring rod around, where the measuring rod is equal to the diameter of the disc, taken as at rest. If the disc now begins to spin, and it shrinks, while the rod does not yet shrink, what happens? As the rod is moved to the edge of the disc in order to tangentially measure, it will shrink in the direction of motion just the same amount as did the circumference. It will therefore still go around \( \pi \) times and the report will be that the diameter times \( \pi \) still equals the circumference. If the rod is brought back to measure the diameter, however, it will find that the diameter has shrunk.

Problem: What gives with the rod, proportionately to the disc?

Well, suppose we obtain the measuring rod by slicing out a rod shaped section of the disc. Obviously, that rod-shaped portion will have shrunken exactly in proportion to the shrinkage of the entire disc, so all measurements performed with it will agree with Euclid’s theorems. In order to maintain Einstein’s position, then, we first have to accept absolute motion (as per immediately prior discussion), then we have to postulate that a disc-shaped object will shrink in the direction of its diameter while a rod-shaped object will stay constant, under the above conditions of identical motion.

This is a somewhat unusual, unnatural, perhaps, even, un-”true” requirement. Oh well, at least Einstein implicitly agrees with Newton’s concept that there is absolute motion in existence. It’s a good thing he does, because much of energy is only different kinds of motion, so if that too is only relative then even energy becomes dependent on a mathematician’s frame of space-time-imagination.

“I am forced to agree that absolute motion of the disc is a fact,” I said in some puzzlement, “but to what is the motion absolute?” Remembering our previous debates I wondered, “What does absolute motion mean?”
“All of our tests showed that the disc really was spinning, or really was at rest. Physical tests, that is. If the disc really was spinning, and physical tests performed upon it show us that fact, then the disc was really spinning relative to itself. With no regard to any other object in existence, the disc spins. For that matter, if there were no objects in nature other than the disc and our lounge we could tell that the disc was spinning. Relative to us? No. After we found out that it spun, we could eliminate the lounge after moving to the disc, and we would still know that the disc spun. We could even tell by the speed of our various clocks whether it stopped spinning. It spins. We know that it spins. Rationally we know.

“The disc spins relative to the rational, Euclidean, Newtonian, and Galilean geometry in our minds.

“If, for a moment, we ignore the theories of science with its great and beloved nothing (void), then we will realize that the disc always exists in a contiguous material environment. If that environment is so far from material bodies as to be at rest to itself, then the physical referent for the spin of the disc is easily recognized a the environmental medium in which it exists. It spins relative to its greater environment.

“That’s how the clocks know just how much to absolutely vary in rate,—the variation is absolute in response to the rate of absolute spin, where the physical cause and effect referent is ether-filled space.”

(After reading the section regarding the mechanism of the gravitational field and its effect, plus that portion dealing with the nature of and mechanism of inertia, you will recognize that in addition to the background “at-rest” medium of the disc’s material environment, there is also a force-matrix centered upon the disc to be considered in ascertaining whether the disc moves and spins, or is at rest.)

After thinking over his arguments I suggested that we remount the discs with some measuring rods and clocks and lights and observers and so forth. I thought we might repeat the measurements to see what happened to $\square$.

“Never mind all this $\square$ in the sky,” my puny punster said. “Instead of showing how a rod would contract in its direction of motion, relative to a rotating disc, and then going on to demonstrate that each segment of the disc would also contract in the same direction, wherefore the disc would shrink just enough for $\square$ to always equal $\square$ let’s go back to the solar system. We set out from there in search of a similar pattern of relative distances between planets to their sun, moons to planets, electrons to atomic nuclei, etc.
Chapter 7

Post-Relativity Discussions

If you will remember the orderly patterns followed by the heavenly bodies, those that led to the Platonic doctrines, you will realize that although Plato’s conclusions were inaccurate, his premises do exist. The heavenly bodies do move in regular, formal paths regardless of what is used as frame of reference. No theory of nature can be complete if it fails to account for that fact. We have a long way to go.

We set off from the depths of space in search of the solar system. I left the astrogation to Duggie, who, you will recall, is an expert in differential and smetinated inculus. I had prepared myself for a long return voyage, but in three days we were back in sight of the sun and its brood.

“How did we get back so fast?” I asked.

“Shortcut,” was the abrupt reply. “We imitated an electron. According to modern science an electron is the only thing in existence that can skip from one orbit to another instantly. Sorry we took so long, but there were several places which had no orbits for us to instantly traverse. We had three days of inter-orbit distances to cover.”

Interesting people I was with. I asked them to please proceed more normally, so that we could perform our measurements as we traveled along the planetary chain. They complied.

While we went through the solar system measuring everything measurable, we searched relativity to find out why it works. We knew that the theories erred and wanted to find the correct way to interpret the successful mathematics.
“What were the successful predictions made via relativity?” I answered Dug’s question, “It was predicted that light would bend as it traveled past the sun. It was predicted that there would be a shift to the red for light coming from a star. It was predicted that the orbit of Mercury would show a certain eccentricity. The predictions were found to be accurate.”

“It seems as though the predictions were two-thirds concerned with the actions of light, and a bit concerned with the path of a planet. Interesting. Let us start with a firm hypothesis that there must be a light-conducting medium for any light to exist. How do the mathematics fit in with that?”

“The transformation equation by which the amount of relativity is determined has one constant in it. Light speed. Begins to fit.”

“What is the referent for the velocity of light?” It would be wise for you to ponder this question for a long moment, reader. All previous discussions of science claim that there must always be a referent, other than that which moves, for velocity. The referent for an absolute speed of light is not specified either in the theory of relativity nor in any other familiar place of modern science. Yet that referent is the whole key to an understanding not only of the mathematics of relativity but to a true understanding as to the nature of the entire physical world.

I answered Duggie, “In the theories of modern science there is no referent for light speed. It is taken as absolute, with no questions asked. It is plank one for all later theoretical constructions.”

Duggie winced at my answer. He mumbled to himself and looked disgustedly at the floor. “Forget it,” he said. “What can be the only valid referent for a light which possessed absolute velocity?”

“In view of all our talks, I would say that the background material medium that conducts the light and is at rest to it must be the referent for absolute velocity.”

“Modern science says that the background ‘medium’ is an absolute void.”

“Then the void must be the referent.”

“Modern science says that that space, or void, can never be the referent for any mathematics.”

“Then space cannot be the referent for light speed.”

“Modern science also says that the void has properties. — It is curved, it carries waves, it affects the path of motion of zillion-ton stars, it alters its metric when matter is present in it, it does all sorts of things that are impossible to a void.”

“How do you explain all that?” I asked.

“Modern science is badly in need of a laxative,” he replied. I was strongly inclined to agree.
“Let’s skip through those Einsteinian experiments again to see just what he really did. We start with the premise that there must be a light-conducting medium. Since light goes everywhere, that medium must itself be everywhere. We make no stipulation as to the state of motion or other characteristics of the medium. How does the train-lightning experimental deduction fit in with this?”

“We have shown that the relativity of simultaneity is not concerned with objective nature at all, but merely describes the subjective reaction to when light reaches a given subject. The variability of time is not natural. If we put a medium back into the picture, and that medium is at rest to earth (as it would be, since it is air) then the lightning would travel at an absolute velocity with reference to the air. It would also travel at that velocity relative to the tracks, since they and the air-ether are mutually at rest. The relativity found by the train rider, if he had found one at all, would be an illusion. According to our experiment though, he wouldn’t have even found any relativity.”

“Assuming that he did, partner, how would you explain that?”

“If he got non-simultaneity for simultaneous events then it would merely show that light takes time to propagate and that he was in motion.”

“Precisely, precisely, precisely! The relativity of time is not of time at all. It is of light. The curvature of space is not a curved space, it is a curved light-path through a medium of variable density. The space-time continuum does not exist.

“The ‘curved space-time continuum’ is really an ether-light continuum. The ether is real, physical, objective material. The light is real, physical objective energy. The ether possesses varied densities and those densities vary with the solid, liquid, or gaseous matter that displaces it.

“The path of light is neither a straight line nor a curve. It is a broad, ever-expanding shell. The direction of that expansion, point for expanding point, may be artificially represented by a straight line. If an artificial section of that light arc be taken for examination as to direction, if a ‘ray’ is watched, it will be seen that the direction light travels is a straight line relative to the density of the conducting medium.

“When that medium is displaced by a body, the sun for instance, the path of light will curve towards the direction of greatest density. That direction will be toward the displacing body— the sun. The Eddington test for curvature of light in the gravitational field of the sun worked. It worked not because of gravity, choice of coordinates, or variable time. It worked simply because the sun and its immediate environment (out to the field of the next star) is a huge convex lens, which has increasingly increasing density with the approach towards its center. The light bent simply because it was refracted by the density of the material filled field.”

That summed up a lot. I understand it completely. Do you? I’ll try to re-explain it for you.
Light is conducted at a given speed relative to a medium of given density. If
the density alters uniformly throughout that medium, then the speed of light will
uniformly alter into a new constant. Rephrased: In a medium of given density, the
speed of light will be constant. If the density of the entire medium is altered to a
new constant density, the speed of light will alter accordingly. The speed of light
is thus a function of the minimal density of the conducting medium, where
“density” represents the concentration of continuous material present rather than
the number of particles per unit volume.

If the medium is of a non-uniform density then the light path will be curved. In
curving relative to a fixed observer, the light speed would be variable along its
front, as was discovered by the general theory of relativity. The relation between
the speed and direction of light, and the density of the ether (variability of metric),
will yield a constant. Ether-light constant. Time, of course, must be rationally held
as constant throughout.

Duggie stood firmly planted in the middle of the lounge, lecturing away at
Glird and me. “Here is the picture. A most fascinating one if I do say so myself.
We have a medium of variable density. Light will pass through a certain amount
of it per second. If the density decreases, then light will still pass through the
same amount per second, but over a larger amount of space. Relative to the
density of the ether, then, the velocity of the light remains constant.

Suppose we stand on earth, though, with fixed-length measuring rods, and
measure the speed of a light ray, by geometry, as it flashes through the solar
system. What would we find?”

(I recognized in this question and its complex answer the solution to the
question of why the theory of relativity works out empirically in spite of complete
falsity of its logic and theoretical conclusions. We shall naturally have to proceed
towards that complex answer in relatively simple, easy stages.)

I replied, after scribbling some drawings on a piece of paper, “Relative to our
geometrical figures, the light would appear to speed up as it entered the zones of
lesser material density. It would have to pass the equivalent of more of our fixed-
length rods per second.”

“Suppose you were told that light could not speed up.”

“If light speed must be considered as constant, even though it isn’t, then I
could postulate that my rods have expanded when placed in the zone traversed by
the light, so that the light would pass by the same number of rods per second out
there, even though it moved faster. Or else I could stipulate that the length of time
represented by ‘one second’ varied out there.”

“Correct. Mathematically, it is possible to arrive at the same results by varying
any necessary dimensions, regardless of whether or not the dimensions actually
vary. The net answers come out the same, mathematically. Empirically, same
quantitative result. It comes out very different, though, with respect to truth and understanding.
Leaving out the dialectic form, we shall now take a close look at some more Relativity arguments. On page 149 of “Relativity” Einstein points out “that up to the present we have been able to find only a few deductions from the general theory of relativity which are capable of investigation, and to which the physics of pre-relativity days does not also lead, and this despite the profound difference in the fundamental assumptions of the two theories.” He points out on pages 150 to 159 that (a) the motion of the perihelion of Mercury should amount to 43 seconds of arc per hundred years, according to relativity, (b) there should be a “Deflection of Light by a Gravitational Field,” (c) there should be a displacement of the spectral lines towards the red, and (d) that “an atom absorbs or emits light of a frequency which is dependent on the potential of the gravitational field in which it is situated.”

In addition to these four areas outlined by Einstein, the theory of relativity is said to adequately “explain” the “negative result” of the M & M experiment, and is considered as essentially responsible for the discovery that

\[ e = mc^2 \]

The success of these many findings is considered a triumph of the theory and a proof that its premises, logic and constructions must be correct.

To upset such a conclusion it is necessary to demonstrate that it is not true that these many findings have been successfully proven. We shall return to relativity’s start, the M & M experiment, to begin that series of demonstrations.
With respect to the M & M experiment, consider that the ether is at rest while the apparatus moves through it. In that event, the path of the light is represented as on page 215 in “Einstein’s Theory of Relativity,” 1962 edition, by Max Born.

“it is by no means possible, however, to measure the short time taken by a light ray to traverse a certain distance. Interferometric methods give us rather only differences of the times taken by light to traverse various different routes between two given points. But they give these with amazing accuracy.

“For this reason M & M caused a second ray of light to traverse a path AB of the same length I backwards and forwards, but perpendicular to the earth’s orbit (Figure 8-1). While the light passes from A to B, the earth moves a short distance for ward so that the point B arrives at the point B’ of the ether.

Thus the true path of the light in the ether is AB, and if it takes a time t to cover this distance, then AB’ equals ct. During the same time A has moved to a point A’ with the velocity v, thus AA’ equals vt. If we . . .”

A lot of arithmetic leads Born to conclude that, “The retardation of the one light wave compared with the other is a quantity of the second order.” Then he says (page 216), “This retardation may be measured with the help of Michelson’s interferometer (Figure 8-2). In this the light coming from the source Q is divided at the half silvered plate P into two rays which run in perpendicular directions to the mirrors S1 and S2, at which they are reflected and sent back to the plate P. From P onwards they run parallel into the telescope F where they interfere. If the distances S1P and S2P are equal and if one arm of the apparatus is placed in the direction of the earth’s motion, one duplicates the case just discussed” (Figure 8-1).
On page 218 he concludes, “When the experiment was carried out, however, not the slightest sign of the expected displacement manifested itself, and later repetitions with still more refined means led to no other result. From this we must conclude that the ether wind does not exist. The velocity of light is not influenced by the motion of the earth even to the extent involving quantities of the second order.”

Page 219 continues: “Let us recall the reflections on which M & M’s experiment were based. We found that the time taken by a light ray to travel to and fro along a distance 1 differs according to whether the ray travels perpendicular or parallel to the earth’s motion.\footnote{Born just finished showing, in the last quoted sentence, that this is false. Why, oh, why does he now assert it again????} In the former case [in which \( b \) denotes \( v/c \)]

\[
t_1 = \frac{2L}{c} \frac{1}{\sqrt{1-b^2}}
\]

and in the second

\[
t_2 = \frac{2L}{c} \frac{1}{\sqrt{1-b^2}}
\]
“If we now assume that the arm of the interferometer which is directed parallel to the direction of the earth’s motion is shortened in the ratio

$$\sqrt{1 - \frac{v^2}{c^2}} / 1$$

the time $t_1$ would become reduced in the same ratio, namely,

$$T_1 = \frac{2L}{c} \frac{\sqrt{1 - \frac{v^2}{c^2}}}{1} = \frac{2L}{c} \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Thus we should have $t_1$ equals $t_2$.

“This suggests the following general hypothesis, the crudeness and boldness of which is startling indeed: Every body which has the velocity $v$ with respect to the ether contracts in the direction of motion by the fraction

$$\sqrt{1 - \frac{v^2}{c^2}}.$$  

“M & M’s experiments must actually, then give a negative result, since for both positions of the interferometer $t_1$ equals $t_2$. Furthermore-and this is the important point-such a contraction could not be ascertained by any means on earth, for every earthly measuring rod would be contracted in just the same way.”

By page 222 we arrive at Lorentz’s next concept: “His result is at least as remarkable as the contraction hypothesis. It is: A new time measure must be used in a system which is moving uniformly.

“In the new theory of Lorentz the principle of relativity holds, in conformity with the results of experiment, for all electrodynamic events. Thus, an observer perceives the same phenomena in his system, no matter whether it is at rest in the ether or moving uniformly and rectilinearly. He has no means at all of distinguishing the one from the other. For even the motions of other bodies in the world, which are moving independently of him, always inform him only of

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1 It is irresponsible for the world of physics to insist that pointer readings and physically measurable items are all that can be “true” in mathematical physics, then build a whole cosmological theory on the foundation of a series of Lorentzian contraction equations whose truth “could not be ascertained by any means on earth.”
relative motion with respect to them and never of absolute motion with respect to the ether. Thus he can assert that he himself is at rest in the ether, and no one can contradict him.\footnote{Duggie, Glird, and I most sharply and specifically contradict him.}

“It is true that a second observer on another body moving relative to the first can assert the same with equal right. There is no empirical and no theoretical means of deciding whether one or the other is right.” (We have and will continue to do so, in terms of the matter-unit, configurations as center of their intrinsic components, in terms of standing-traveling wave force-matrixes, in terms of Fresnel’s convection experiments, in terms of absolute motion through a contiguous material medium, and in terms of all the realities of nature.)

“Consequently, we arrive at the same position with respect to the ether as the principle of relativity of classical mechanics did with respect to the absolute space of Newton. In the latter case it had to be admitted that it is meaningless to regard a definite place in absolute space as something real in the sense of physics. For there is no physical means of fixing a place in absolute space or of finding it a second time. In precisely the same way we must now admit that a definite position in the ether is nothing real in the physical sense, and for this reason the ether itself entirely loses the character of a substance. Indeed, we may say, if each of two observers who are moving relative to each other can assert with equal right that he is at rest in the ether, there can be no ether.”

Duggie and Glird have already demonstrated many of the errors embedded within these quoted pages. There are many more. (They are errors of scientific theory, not of the quoted author.) Indeed, the greatest error lies within the last sentence. Postulate: An observer in zone A, which lies here in this room. Another observer in zone B, which lies peacefully within an orbiting sputnik. The ether in both cases is shaped and constrained into “air.” To paraphrase Born’s sentence, then, “Each of two observers who are moving relative to each other can assert with equal right that he is at rest in the ether, and there is an ether.” What science refused to recognize in spite of the weighty evidence is that even a jelly-like ether can be distorted, displaced, moved, hence be in motion with respect to itself.

Look again at the case represented by Figure 8-1. Note point A”. Compare the Figure 8-1 with Figure 8-2 which “duplicates the case just discussed.”

It takes a tiny jiggle of the mind to insert the classical principle of relativity onto Figure 8-1, so as to convert it into an equivalent of Figure 8-2. The jiggle runs like this: It is just as valid to say that the ether moves through the kinetic-atomic-earth as that the earth moves through the ether, so we shall draw our pictures as in Figure 8-2 instead of Figure 8-1 since it is easier to think about results drawn that way. That little jiggle seems to have successfully diverted the
attention of scientists from a tremendous error produced by such a transfer. If you will just draw the looo-o-ng telescope (F) which was in Figure 8-2 perpendicular to line A A’ A”, and at point A” you will begin to see the error. Look: (This is a complicated thought, so don’t drop any stitches.)

Should F still be perpendicular to A A’ A”, as it is in Figure 8-2, or should it be at the angle of line B’ A” so as to collect the light down at the eyepiece? At what angle shall the telescope be set?? This question is real and physical, and implies a severe error in the mounting of the very experiment itself.

The complication is this. We reveal that Figure 8-3 is an optical illusion by remembering that the telescope must move to the right with the same speed as Earth, so the continuation of line A”B’ (on the drawing) will not accurately represent the path of the light through the telescope. As a real beam moved down that line the telescope might move to the right at exactly the speed required to keep the beam centered in the telescope. Does it? The first stitch is Bradley’s telescope and the angle of aberration of the fixed stars; (on page 109); the aberration requiring the telescope to be aimed at an indirect angle, not straight at the star, to allow for Earth’s motion. The next stitch is: Fresnel’s convection arithmetic, Fizeau’s experiment, and “the Airy-Hoek experiment (which) required that the ether filling the tube (telescope F in the diagrams) have greater density than that outside and that either the ether inside is permanently attached to the tube and that tube and all move through the free ether like a tube filled with jelly moves through a basin of water, or else that the ether flows in at one side and out at the other, crossing the tube with a speed less than that of the tube.”

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1 A Debate on the Theory of Relativity,” p 67.
In such a telescope moving through the ether, Fizeau’s experiment showed that only a partial convection of ether seems to occur (see pages 97 and 110), because the light path only partly follows the motion of the conducting medium. If the medium moves with the telescope, but light lags behind at a degree described by Fresnel’s experimentally verified convection formulae, then whatever Airy-Hoek alternative we choose, the angle of the telescope in Figure 8-3 must be offset from the perpendicular at least enough to allow for the Fresnelian lag in the light path therein.

In an experimental chamber the entire chamber acts as the Airy-Hoek tube, wherefore chamber “and all move-like a tube filled with (etheric jelly) through a basin of (interplanetary space).” In that event, of course, it would be quite correct to set the telescope perpendicular, as in Figure 8-2. We thus see that the angle of mounting of the telescope differs if Figure 8-2 represents the reality, or if Figure 8-1 happens to be true. This is a direct contradiction of the principle of relativity.

We can be sure that in the actual M & M test such a tube is always perpendicular to AA”. And we know that light does reach the eyepiece. We just determined that if the apparatus was really moving through a light-conducting medium a beam could not arrive at an eyepiece so mounted, because of aberration and/or Fresnelian partial convection. The fact that light reached the eyepiece shows, again, that the apparatus was at absolute rest within the light-conducting medium. This denies the possibility of any crude and bold contractions, let alone any remarkable alterations in time.

Summary

To look at a distant star, a telescope has to be pointed at a different angle because the Earth is moving, than it would have been had Earth been standing still. Regardless of what the intervening ether happens to be doing. Many experiments have demonstrated this.

This being so, then the angle of mounting of the telescope in a situation in which the apparatus is stationary (as in Figure 8-4) cannot be the same as the angle of the telescope when the apparatus is in motion (as in Figure 8-3).

Conversely, if we don’t know the state of rest or motion of the apparatus, we can discover it by testing whether or not a perpendicular tube carries electromagnetic waves straight through to an eyepiece, or if not, the angle of aberration required to see the beam.

In any event, we see that the equivalence of points of view as to motion, i.e., the “principle of relativity” cannot be correct.
In Figure 8-4 the ether and apparatus are at rest. The lights collect at the eyepiece of telescope F. In Figure 8-5 the ether moves to the right and partially carries the light path with it, a la Fresnel’s equation. For a telescope F to “see” the beam from B’, the telescope would have to be moved a suitable distance to the right, and its angle turned to the dotted image position. Once the light entered the telescope F, say Airy-Hoek, the path will straighten. The beam from C will return to A’ and be missed by the telescope at high ether speeds.

If, in Figure 8-5, the distance A’ A” and aberration of the beam is small enough as to still permit the beams from B’ and C to be seen simultaneously, then there should be interference patterns revealed. If this experiment were so performed, instead of being done in closed and sealed chambers in which the conditions of Figure 8-4 prevail, results other than now existing for the M & M tests would obtain. Indeed, that is exactly the positive-interference-pattern results such tests did show in the hands of Fizeau! (See page 97.)
In Figure 8-6 it is evident that instead of lagging Fresnelianly behind, the mirrors move to the right at one-third light speed. In this case B, mirror A’, and C move at a full speed one-third of light speed, as the various beams reflect perpendicularly back and forth from them. B’s beam comes down where F was at moment 3. C’s beam comes down somewhere near where F was at moment 5. By moment 12, about when the beams would have descended to F, F is fifty-odd thousand miles away.

Similarly, several further diagrams representing various degrees and different items in motion can be drawn to demonstrate that since there is not a 1-to-1 equality between the motion of a conducting medium and the path of the conducted beam, there is a physical, measurable, predictable, arithmetically formulateable difference when the medium moves rather than the various platforms. This demonstrates that the first premise of Einstein’s theory of general relativity is sometimes false.

We have thus far found out:
1. The principle of relativity is inaccurate with respect to light. This principle is the first premise of Einstein’s relativity.
2. The principle of the constancy of the velocity of light is inaccurate, according to Einstein. That principle was his second premise.
3. Duggie and Glird demonstrated the inaccuracy of the relativity of simultaneity, which was the third principle of the restricted theory of relativity.

4. These many items were the premises for the general theory of relativity.

It is our consequent opinion that even though the theory of relativity has been of great worth, and despite its manifold errors does represent a monumental intellectual achievement, it requires extensive revision. The revision required is so comprehensive as to demand an entirely new theory as to the nature of reality. The value of Einstein’s concepts to that new theory is that said novel concepts must conform to and provide meaning for the same mathematical forms as those Einstein selected for his own theories.
Chapter 9

What Gravity Does to Light

With respect to two spheres “dropped” by an observer in an accelerating chamber, George Gamow agrees with Einstein’s false conclusion that all experiments would convince the observer that “a regular gravitational field does exist in his space laboratory.” With respect to whether the phenomena were attributed to an acceleration or gravity, Gamow continues in his book “Gravity,” “Both descriptions of what the spheres would do are equally correct, and Einstein incorporated the equivalence of the two points of view in the foundation of his new, relativistic theory of gravity. This so-called ‘principle of equivalence’ between observations carried out within an accelerated chamber and in a ‘real’ field of gravity would, however, be trivial if it applied only to mechanical phenomena. It was Einstein’s idea that this equivalence is quite general and holds also in the case of optical and all electromagnetic phenomena.”

It is best to look to the source before continuing with someone else’s interpretations, so we will return to Einstein’s “Relativity” in which it says, on pages 88 and 89:

“. . . a body which is in a state of uniform rectilinear motion with respect to K (in accordance with the law of Galilei) is executing an accelerated and in general curvilinear motion with respect to the accelerated reference-body K’ (chest). This acceleration or curvature corresponds to the influence on the moving body of the gravitational field prevailing relatively to K’. It is known that a gravitational field influences the movement of bodies in this way, so that our consideration supplies us with nothing essentially new.
“However, we obtain a new result of fundamental importance when we carry out the analogous consideration for a ray of light. With respect to the Galileian reference-body $K$, such a ray of light is transmitted rectilinearly with the velocity $c$. It can easily be shown that the path of the same ray of light is no longer a straight line when we consider it with reference to the accelerated chest (reference-body $K'$). From this we conclude that, in general, rays of light are propagated curvilinearly in gravitational fields. In two respects this result is of great importance.

“In the first place, it can be compared with the reality . . .

“In the second place, our result shows that—the law of the constancy of the velocity of light in vacuo, which constitutes one of the two fundamental assumptions in the special theory of relativity . . . cannot claim any unlimited validity.”

Good enough. Gamow provides us with an ideal interpretation of the concept, using observers stationed in an accelerating rocket-ship.

Figure 9-1.

“Let us consider what happens to a beam of light propagating across our space chamber from one wall to the other. We can observe the path if we put a series of fluorescent glass plates across it or simply if we blow cigarette smoke into the beam. Figure 9-1 shows what ‘actually’ happens when a beam goes through several glass plates placed at equal distance from one another. In (a) the light hits
the upper section of the first plate, producing a fluorescent spot. In (b) when the light reaches the second plate, it produces fluorescence closer to the middle of the plate. In (c) the light hits the third plate still lower. Since motion of the rocket is accelerated, the distance traveled during the second time interval is three times greater than during the first one, and hence, the three fluorescent spots will not be on a straight line but on a curve (parabola) bent downward. The observer inside the chamber, considering all the phenomena he observes as due to gravity, will conclude from his experiment that ‘the light ray is bent when propagating through a gravitational field.’ Thus, concluded Einstein, if the principle of equivalence is a general principle of physics, light rays from distant stars should be bent if they pass close to the surface of the sun on the way to a terrestrial observer. His conclusion was brilliantly confirmed in the eclipse of 1919 when a British astronomical expedition to Africa observed the displacement of the apparent positions of stars in the neighborhood of the eclipsed sun. Thus, the equivalence of the gravitational field and the accelerated systems became an indisputable fact of physics.”

The biggest problem with this section of relativity logic is how to limit the objections. Instead of going through the whole bit about variable rates of acceleration with increased mass, in response to absolute rates of motion; instead of waiting for the rocket ship to run out of fuel and stop accelerating; instead of pointing out that the (lack of 1-to-1 correspondence between the motion of the conducting medium and the path of the conducted beam) will eliminate the neat curves Gamow presents; instead of pointing out that (the scientific failure of any and all internal tests to demonstrate changes in the path or speed of light beams as a result of direction of motion) makes it impossible, in principle, for Gamow’s space men to discover such changed light paths in response to constant rates of motion, hence, if we select suitably moving coordinates, equally impossible to discover either absolute acceleration or its effects, on light . . . unless much of modern theory is as wrong as it is; instead of calling du Gabriel and Glird back for a series of dialectic experiments, let us just consider the diagrams of Figures 9-2 through 9-6.
Figure 9-2 consists of Einstein’s reference body K, with a series of seven laser emitting bulbs. Each bulb emits a beam parallel to the y axis. The space ship starts at rest, opposite the x. It then accelerates. The seven perpendicular ships represent one ship at seven consecutive positions. It is accelerating. As it reaches each of the positions, it moves at a faster speed as the laser enters than in the prior position. The angle of the curve seen by Gamow’s experimenters will be that shown in the figures at B, each of which demonstrates the “curve” the light will appear to follow in that sequence. It is seen that each successive curve is steeper than its predecessor, and that the curve for bulbs 1, 2, 3, etc. will be that section of the parabola enclosed by the successive ships of Figure 9-3.
Relying on his “knowledge” that light has a constant curvature in a gravitational field the observer would know that if his space ship were actually suspended in such a field, while successive beams were flashed through from wall to wall, each and every successive beam coming from the same distance would possess the identical curvature. Since he “sees” that the successive beams passing through his ship continuously increase the steepness of their curvature he must immediately admit that he is not suspended in a gravity field. He must then admit the non-equivalence of acceleration and gravitation on light. He can then place the segment of the parabolic curve for any given beam upon the complete parabola, and by extrapolating backward deduce the instant at which he began to accelerate as well as his rate of acceleration and total speed at a given moment, with respect to $K$.

The curvature of successive light beams in a gravitational field is constant, while in an accelerative field it steadily alters. There is thus an experimentally demonstrable difference between a gravitational field and acceleration, as well as a difference between relative motion and absolute motion.
To point up the difference between absolute and relative motion consider Figure 9-4. According to all the principles of relativity it is equally correct for the men in the rocket to consider that the rocket is at rest while the system $K$ accelerates (downward). In Figure 9-4 it may be considered either that there are five space ships suspended in space, or that there are five consecutively lower ports in the wall of one long ship suspended there. The $x$ axis of the accelerating xy coordinate system $K$ has a laser bulb attached. As the bulb passes, in temporal order, points 1, 2, 3, 4, etc., it flashes a beam directly at the ship. The laser is fixed so as to be “aimed” parallel to the $y$ axis. Since the speed and direction of a light beam is considered to be independent of the velocity of its source body, the fact that the bulb will be moving successively faster at each successive point can have no affect on the fact that the beams will all pass horizontally through the space ship, at successively lower intervals.

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Figure 9-4

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Figure 9-5.
Figure 9-5 represents approximately the same thing, except that there is one horizontally aimed laser, fired at constant intervals. Since system K is “accelerating” downward, the distances between firing points 1, 2, 3, etc., will be successively larger. The paths of the beams (being independent of the motion of their sources) will nonetheless be parallel as they pass through the space ship, or space ships.

![Figure 9-5](image)

Figure 9-6.

Figure 9-6 represents a group of observers standing on each other’s head as they try to figure out how to accommodate Fresnel’s beam-lag, M & M’s failure to demonstrate altered light-speed despite a relatively accelerating (rotation-plus-constant-motion-in-orbit represents a variable speed, hence an “acceleration”) space ship (earth), and the lack of measurable advance knowledge of where the beam is coming from in the first place.

These various diagrams show that there will be a difference in the apparent path of light if the space ship really accelerates or if the system K really accelerates. The secret premise beneath Gamow’s demonstration and Einstein’s discussion is that the path of light is constant relative to space. This concept is verbally admitted by everyone, including both gentlemen, to be meaningless.

Considering this concept only with respect to the systems K and K’ in a purely Einsteinian fashion, we must point out that since it is meaningless to attach such coordinate systems to either space or space-time, he must have attached them to
objects such as “the Galileian reference-body K” and “the accelerated chest (reference-body K’).” When real bodies moving through a material filled space are considered, it is erroneous to fail to take into consideration (a) the effects that the (motions of these bodies upon the intervening medium) will have on a light-path; (b) the effect that the state of rest or motion of the light-conducting medium within each object will have on said path; and (c) the effect that the structure, density patterns, and degrees of motion of the intervening medium will have on that light-path.

If reality (actual physical experiment) is invited to participate in Gamow’s precise example of Einstein’s concept, it must be recognized that the space ship is the exact equivalent of a Bradley telescope in that it represents a closed chamber moving through space. A light entering that barrel, whether coming from a distant star or not, follows a path which is a straight line with respect to the material within the barrel. The Airy-Hoek experiment showed that said material moves bodily along within the tube.

A consideration of the many possible effects acceleration, absolute motions, relative motions, gravitational fields, and other variable conditions of the material field have on the paths of beams of light must lead to the conclusion that Einstein’s opinions as to the curvatures in a gravitational field are only very dimly possible. With respect to that equivalence conclusion, wherein Gamow says Einstein’s “conclusion was brilliantly confirmed” by test, and became an indisputable fact of physics,” ¹ this equivalence concept depends on a constant path of light through an absolute, stationary ether. How does that idea stack up against tested experiments on the ether itself?

“Is it not possible to think of a scheme in which the motion of the earth and the ‘ether wind’ produced by it make themselves noticeable? Many experiments have been designed and carried out to discover this motion. The general result of experiments with terrestrial sources of light teaches us that not the slightest influence of the ether wind is ever observable.” ²

But doesn’t the curvature of Gamow’s beam depend on the equivalent of an “ether wind” accelerating “downward” through the space ship? With no Fresnel-lag? Yes it does, hence is unsatisfactory.

“But we might expect a positive result if we took a source in the heavens instead of on the earth.

“Arago actually carried out this experiment, but found no change in the position of the focus. How is this to be explained?

“We made the assumption above that the velocity of light in a body moving with velocity v in the opposite direction to the light ray is greater by v than if the

¹ See quotation on page 67.
body were at rest in the ether. In other words, we have assumed that material bodies penetrate the ether without carrying it along in the slightest degree, just like a net carried through water by a boat.” ‡

This is manifestly the Gamow-Einstein position.

“The results of experiment teach us that this is manifestly not the case. (1) Rather, the ether must participate in the motion of matter. It is only a question of how much.

“Fresnel established that to explain Arago’s observation and all other effects of the first order it was sufficient to assume that the ether is only partly carried along by matter. We shall forthwith discuss in detail this theory, which has been brilliantly confirmed by experiment.” ‡

Since these discussions all concern the actions of light, we shall not quibble over the fact that the experiments have all been “brilliant.” Since the two “brilliantly confirmed” arguments contradict each other’s premises, however, someone must be inaccurate. “In the first place, it can be compared with the reality,” said Einstein. Let us do exactly that.

“To Einstein’s law of gravitation Newton’s law is an extremely close approximation so that these laws give results in our own solar system which are indistinguishable from those of Newton except in one place, namely, the motion of the perihelion of Mercury. The law which is usually used was first given by Schwarzschild and it indicates an advance in the perihelion of Mercury of 43 seconds of arc per century greater than that indicated by Newton’s Law. Now it happens that there were two small discrepancies between the implications of the Newtonian theory and the observations. One of these is a slight irregularity in the motion of the moon, and the other is that the perihelion of Mercury is advancing 43 seconds per century faster than the theory indicated. Einstein’s theory would explain one of these, but not the other.

“That Einstein’s law of gravitation should fit one of these discrepancy so perfectly and ignore the others altogether is a bit puzzling. But naturally the relativists seize upon this one agreement as a striking confirmation of their procedure.

“The electromagnetic theory was based upon the concept of an ether, and it is the relativists themselves who put the ether into the discard. This is one of the defects of the doctrine of relativity for it does not say anything about how light is propagated. Both the emission theory and the wave theory give clear notions on this point. They may not be adequate, but the doctrine of relativity gives nothing at all.

“We of the present generation are too impatient to wait for anything. Within thirty years of Michelson’s failure to detect the expected motion of the earth with respect to the ether we have wiped out the slate, made a postulate that by no means whatever can the thing be done, and constructed a non-Newtonian
mechanics to fit the postulate. The success which has been attained is a marvelous tribute to our intellectual activity and our ingenuity, but I am not so sure with respect to our judgement.

“It is not our normal mode of procedure to assume, after two or three failures, that by no means whatever can the thing be done. It is particularly distasteful to do so when such an assumption involves the conclusion that our experience can no longer be interpreted in terms of the time and space of our intuitions, and that we have accordingly reached the limits of what is intelligible.

“It will be observed that in the preceding discussion I have granted all of the claims of the relativists, and still I have denied their conclusion that the relativists are the sole dispensers of the truth and that we must all become relativists. The situation is something like that of a boy and his bed clothes. The boy grew but discovered that his little toes were sticking out from under the covers and he was decidedly uncomfortable. Try as he would the bed clothes could not be stretched far enough to cover them up.

Suddenly he had a bright idea. All he had to do was to slip the entire bed covers down six inches. His feet went under beautifully and he was so happy about it that it took him some time to discover that now his neck was uncovered and that he had merely shifted the seat of difficulty for the bedclothes were no longer than they were before. The relativists have succeeded in covering up the little terms of order two, but in doing so they have robbed us of all ideas as to how light is propagated in space, and that problem is even more important than the little difficulties at the other extremity.

“Let us turn attention now to another of the so-called proofs of Einstein theory. This is the advancement of the perihelion of the planet Mercury. It is well known that the orbits of the planets are ellipses. It has been observed that the orbit of Mercury slowly rotates about the sun. Leverrier computed the path of Mercury, taking account of the attractions of Earth, Venus, Jupiter, and three other bodies. He found that the actual and calculated motions failed to agree by an amount which would be nearly 38 seconds of arc per century. Leverrier could not understand this discrepancy and suggested that there might be unknown masses of matter near the sun. Since that time some matter has been found and exactly where Leverrier predicted that it should be. In 1895, Newcomb repeated the calculation and by slightly reducing the eccentricity of the orbit he slightly increased the rotation and obtained 41 seconds per century.

“Now Einstein by the use of the equations of relativity has calculated that the perihelion of Mercury should rotate 43 seconds per century due to the supposed change in space and time in the neighborhood of the mass of the sun. It has been pointed out by Professor Poor that, in making these calculations, Einstein failed to use his relativity unit of time, but used instead our constant Newtonian unit of time. The agreement between the calculated values of Leverrier and Newcomb on
the one hand, and of Einstein on the other has been considered definite proof of relativity. But it must be remembered that Newcomb was forced to guess the density of Mercury and the other planets. Hence, Figure 9-7 may be far in error. Since the so-called verification by the calculations of Einstein, the rotation of the perihelion of Mercury has been recalculated and values 33 and 29 have been announced. We have here a variation of 27 percent.

“Another observation which has been considered a triumph for relativity is the bending of a ray of light which passes near a massive body. Of course to make measurements of the displacement it is necessary to utilize the few minutes during a solar eclipse. Two opportunities for such observations have occurred. Observations were made by British astronomers who were sent on an expedition to South Africa in 1919 and the Lick Observatory sent an expedition to Australia in 1922.

“But in examining the conditions of the observations and the results, one wonders whether the proof is so complete. In the first place, both Professor Eddington who headed the British party and Professor Campbell who was in charge of the American group are enthusiastic relativists and one must wonder whether they approached their problem with entirely unbiased minds. In the second place, it has been shown the 0.87-second deflection, that is, half of the computed amount, should be expected on the basis of the Newtonian corpuscular theory.

“The apparent displacements due to bending of light by the sun, as computed on the basis of relativity, are shown in Figure 9-10. The photograph is from a drawing by Professor Poor. Figure 9-11 is a photograph of a drawing of the actual displacements of the stars by Professor Poor. These displacements were made from the data of the Lick Observatory astronomers. In both of these photographs, one theoretical and the other from the data of observation, Professor Poor has multiplied the displacements by a given constant factor. It will be observed that in some cases the bending near the sun was far less than was expected and some of the beams farther out are bent far too much. Fifteen of the star images show bending in the predicted direction and twenty-six show a deviation exactly opposite to that required by relativity. Out of these complicated displacements Professor Campbell deduced results and announced 1.72 seconds as the observed displacement. A re-calculation, however, showed 2.05 seconds. This is a 17 percent variation from the amount predicted. No experimental observation can be regarded as decisive with such a large difference as this, and especially when the difficulties of observation and the extremely limited time are taken into account.”

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Figure 9-10.

Figure 9-11.

From C. L. Poor in the Forum Magazine
The experimental evidence would seem to lend some weight to the opinion that relativity is in error. “Fifteen of the star images show bending in the predicted direction and 26 show a deviation exactly opposite to that required by relativity.” Professor Hufford liberally concedes this to be a 17-percent variation. It appears more like a fairly conclusive denial of the validity of the prediction, in that over 65 percent of the images bent the wrong way.

When we accept the presence of the material ether around the sun, as well as between the sun and us, then recognize that the density of that ether falls off with the distance from the sun, we can expect bending of beams of light tangentially passing the sun. When we recognize the turmoil that exists in that ether as a result of the passage of that large, active, hydrogen bomb sphere, we would expect just the variations of position—some nearer, some further—that observation revealed.

We would also expect that the speed of light would be as variable in these zones as the density of the ether, but in the non-1-to-1 ratio expressed by Fresnel’s equations. Is it possible that Fresnel’s equations for the lag of light path in moving media became the basis for Lorentz’s contraction equations? And that Lorentz’s contraction equations are the root of Relativity? And that the Fresnel or Lorentz equations, which are Euclidean, are the root of the denial of the validity of Euclidean geometry?

Whether so or not, the foregoing considerations amply confirm the logical conclusions that Einstein, and relativity physicists are sharply erroneous in their logic, in their conclusions, and in their occasional attempts at an explanation of the structure of nature.

In that variable density ether, where the light goes at a certain constant rate with respect to the amount of ether traversed per unit time, how does one measure the velocity of light? Relative to me, it is one thing. Relative to the amount of medium, another. Relative to a person who moves through the medium and thus achieves a Fitzgerald contraction on his rods, another. Relative to the same person, still moving through the medium, but with his rod enclosed inside of solid containers (thereby probably eliminating any Fitzgerald effect), another speed. How do you even specify distances, under such chaotic measuring conditions? It takes no powerful brain to realize that there must be a duality involved in specifying measurements with such a variable-density ether, variable-but-dependently-constant-light-speed set-up. If we keep our yardsticks and time values constant, then we have but to draw up our geometries with some form for representing the variations of density of the ether, and we can easily plot a light speed curve, or line. The curvature of “space-time” represents the curved path light would follow relative to us, if it traveled through a medium of uneven density. The “curvature of space” represents a purely mathematical, abstract
method of describing in coordinate measuring systems a material medium of a continuous-contiguous nature which has a variation of density. If the geometry is drawn to conform to the density-metric of the medium, then light would move in a straight line relative to the curved graph. It would be a “straight line” that “curved.” It would have begun to enter the realm of moebus-relativity structure, thus have begun to defy sensible understanding.

Easily reconciled, though. In order to understand this, it is but necessary to understand the “curved metric” of the medium. In order to understand such a “curvature,” it is necessary that there be a straight, fixed, but perfectly arbitrary and rational (mentally invented) classical geometrical metric as a referent. All the curvatures and expanding-contractions may easily be followed by plotting them upon a Galilean geometrical background.

Instead of time, it was always light. Rather than space, it was ether. We need but admit the truth. The Gaussian four-dimensional metric of a local, specific segment of ether is understood only by reference to the constant Euclidean metric upon which it has always been plotted in secret.
Chapter 10

e = mc^2

“Einstein’s equation $e=mc^2$, which states the proportionality of energy and inertial mass, is perhaps the most important result of the theory of relativity. We shall give another simple proof of it, due to Einstein himself, a proof which does not make use of the mathematical formalism of the theory of relativity. (i) It is based on the fact that radiation exerts a pressure. From Maxwell’s field equations, supplemented by a theorem first deduced by Poynting (1884), it follows that a light wave which falls on an absorbing body exerts a pressure on it. It is found that the momentum transferred to an absorbing surface by a short flash of light is equal to $e/c$, where $e$ is the energy of the light flash. This fact, which we will prove in the following section, was confirmed experimentally by Lebedew (1890) and again later with greater accuracy by Nichols and Hull (1901) and others. Exactly the same pressure is experienced by a body which first emits light, just as a gun experiences a recoil when a shot is fired.

“We next imagine a long tube at whose ends are two bodies A and B which are exactly equal and are composed of the same material and which, according to ordinary ideas, have the same mass (see Figure 10-1). But the body A is to have an excess of energy $E$ over that of $B$, say in the form of heat, and there is to be an arrangement (concave mirror or something similar) by which this energy $E$ can be

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1 This is a fine example of how to derive the famous $e=mc^2$ with no need for Relativity!!! We have already seen how the Theory of Relativity was false in all its logical details, as well as wrong in its tested conclusions about eclipseal effects. Now we find that it wasn't even required to find that energy and mass are related. The above “proof” comes strictly from Euclidean geometry and classical physics.
sent in the form of radiation to $B$. Let the spatial extent of this flash of light be small compared with the length $l$ of the tube.

"Then $A$ experiences the recoil $E/c$. Thus, the whole tube, whose total mass we take as $M$, acquires a velocity $v$ directed backwards and determined by the equation of momentum

$$Mv = E/c$$

This motion continues until the flash arrives at $B$ and is there absorbed. Then $B$ experiences the same blow forwards, and hence the whole system comes to rest. The displacement which it undergoes during the time of travel $t$ of the flash is

$$x = vt$$

where $v$ is to be taken from the above equation. Thus,

$$x = Et/Mc$$

"The time of travel, however, is determined (except for a small error of higher order) by

$$l = ct$$

Hence, the displacement is

$$X = El/Mc^2$$

"Now the bodies $A$ and $B$ may be exchanged (this may be done without using external influences). Let us suppose that two men are situated in the tube, who put $A$ in the place of $B$, and $B$ in the place of $A$, and then themselves return to their original positions.

![Diagram](image.png)

Figure 10-1.
According to ordinary mechanics the tube as a whole must suffer no displacement, for changes of position can be effected only by external forces.

"If this exchange were to be carried out, everything in the interior of the tube would be as at the beginning, and energy E would again be at the same place as before, and the distribution of mass would be exactly the same. But the whole tube would be displaced a distance x with respect to its initial position by the light impulse. This, of course, contradicts all the fundamental canons of mechanics. We could repeat the process and thus impart any arbitrary change of position to the system without applying external forces. That is, however, an impossibility. The only escape from the difficulty is to assume (!) that when the bodies A and B are exchanged, these two bodies are not mechanically equivalent, but that B has a mass greater by m than A in consequence of its excess of energy E. Then the symmetry during the exchange is not maintained, and the mass m is displaced from right to left by a distance l. At the same time the whole tube is displaced a distance x in the reverse direction. This distance is determined by the circumstances that the process occurs without the intervention of external influences. The total momentum, consisting of that of the tube, $Mx/t$, and that of the transported mass, $-m1/t$, is thus zero. Then

$$Mx m1 = 0$$

from which it follows that

$$x = m1/M$$

"Now this displacement must exactly counterbalance that produced by the light impulse. Hence, we must have

$$x = m1/M = E1/MC^2$$

This allows us to calculate m and we get

$$m = E/c^2$$

"This is the amount of inertial mass that must be ascribed to the energy E in order that the principle of mechanics which states that no changes of position can occur without the action of external forces remain valid." ¹

Let us paraphrase this demonstration. Instead of two bodies otherwise equal, let us mount a gun at one end and an absorbing block at the other, in the tube. Let

the gun fire. The recoil will fling the tube backward, and the motion will cease when the compensating recoil occurs on the bullet-struck block. Now, instead of two men, let there be one chemist plus all the appropriate paraphernalia required. Let the chemist gather all the exhaust products of the explosion together, and recreate the original explosive powder. Let him regain the bullet, and the shell, recharge the affair and stuff it back in the gun. Let him return the block to its pre-struck condition and position. Now all is back where it had started. Except the tube. Since no external forces have been used during all this, the “principle of mechanics states that no changes of position can occur.”

Suitable calculations should now show that

\[ E = M_{\text{bullet}}^2 \]

Or, perhaps, any other result we elect? By suitable omissions and choices of required steps?

Going a step further, suppose we replace the gun with a machine gun. Every shot will move the tube a bit further, before the bullet lands. We could move the tube as far as we have bullets to fire, before starting to chemically retrieve the starting position. Have we forgotten anything? Entropy, perhaps? The second law of thermodynamics, perhaps? Has Max Born followed Einstein in the error of allowing a hot body to release its energy as light, then to have the absorbing body absorb it as heat, only to be able again to release it as light.

Question: How did the hot body continually convert its heat into light, and then always emit the light toward the mirror?

Question: Since E always goes from a higher form of energy to a lower, and heat is considered the lowest, is not some external source of energy required either to cause bodies A or B to emit heat as light, and/or to allow the chemist to recreate the gunpowder?

Answer: Yes, the laws of physics have been ignored so as to make the assumption that mass and energy are equivalent. So as to provide a skin-deep “simple proof,” heat is allowed to convert into light, spontaneously, and then do it again and again. Similarly for the gun-tube tests, which actually might work, so long as fresh bullets exist. But with each bullet that was fired, the temperature in the tube would increase. With each such increase, a certain portion of heat would radiate away from the tube. With each such radiation, some E would leave the tube, as the entropy inside increased. In time, with no outside source of energy, all action inside would cease. Meanwhile, since energy exchanges are thus taking place between tube and environment, there can be no interval It without the action of external forces,” and thus the quoted principle of mechanics does not apply.

The vagueness of “proofs” based on unwarranted “assumptions”, using as experimental tools items such as light and heat and mass and energy whose
ultimate nature was a total mystery, could have led only to the type of flagrant errors that now exist in the world of the theoretical mathematical physicists who constantly and uncritically permit and use such tactics.

Though entropy and the second law of thermodynamics make it hard to accept this “proof” as valid, we are glad to discover that even this last stronghold of the Theory of Relativity, i.e., \( e = mc^2 \), is independent of that four-dimensional Moebus-inversion of logic and could have been assumed from classical physics.

What reason lay behind the physical theories of classical versus modern physics?

In classical, Newtonian physics “mass” was taken as an invariant property of matter. Space (void) was taken as absolute, as was time. Space and time were both taken as physical items in nature. Newton’s famous laws of motion were predicated on these assumptions. Although Newton very carefully refrained from framing any original hypotheses, he made uncritical use of very many prior ones invented by minds now held far inferior to his own. Odd.

Relativity physics eliminates space and time as absolute items, only to replace them with an equally non-physically real spacetime continuum. The void still remains a part of relativity concepts. “Mass” is transformed from a property of matter into a mystery. (Mass was not merely transformed into a property of energy, else matter would remain when mass left. Indeed, we shall see that mass really is a property of energy, wherefore matter, in its continuous ether form, does still persist even though: its mass may have been lost.

Classical physics considered inertia and gravity as two basically different things. Relativity physics considers them both the same thing, where the difference is only due to different mathematical points of view (called “frames of space” or “coordinate systems of reference”).

Classical physics had adopted the view that a continuous medium is required to transmit wave energy (electromagnetic waves), had worked out the mathematical equations to define the mode of action of these phenomena, and had successfully demonstrated the experimental validity of these equations. Relativity physics adopted a part of these equations, but used them to deny the bases through which the equations had been derived.

Relativity physics produced the proved equation \( e = mc^2 \), and then decided that this equation means that matter and energy are interconvertible. The logic of relativity erred all down the line, and its greatest error of all lies in the latter ultimate absurdity.

Although we thus find relativity theories invalid, we also find that their success, taken on top of the M & M proof that prior theory was wrong,
demonstrates the falsity of the opinions of classical physics. In short, there is not now, nor has there even been, a correct basic theory of the structure of nature.
PART II

Matter
This construction of a definitive understanding of inanimate\(^1\) nature has one essential premise with one most important direct consequence. The prime premise is the result of an extended analysis of centuries of investigation and thought.

**Premise**

Every wave motion has a material conducting medium. This premise comes high on the level of human understanding, in terms of the theories of natural philosophy and science. It takes full heed of the concepts of electromagnetic propagation, of the various ether theories, of the modern denial of a material medium in the space between the stars in favor of a space-time continuum. We enter into some study of these various subjects in the course of this book.

Because light, magnetism, gravity, heat, and any other radiant waves do indeed travel through every place and space in the universe, our prime premise demands the following unshakeable primary consequence.

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\(^1\) Editors’ Note: “inanimate”, here means generally non-classifiable as “living”. The continuum of matter, however, is in motion at all scales so could quite easily be considered as inherently “animate”.

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Prime Consequence

Matter is continuous where it is not discontinuous.
This consequence takes into account not only the evidence offered by the abovementioned field energies, but also respects the enormous store of data relating to the existence of separate particles as per the kinetic-atomic theory of the structure of matter.

The premise and its consequence are more than merely a distillation product, however, they require subtle changes in the very data from which they were deduced, and the final conclusions to which they lead introduce fine-scale corrections in the most unexpected, yet important areas of thought.

The kinetic-atomic theory says that all matter is made of discrete, separate particles. Our premise requires that this theory must somehow be wrong, in spite of all the accumulated weight of evidence in its favor. For we know that however small and far apart our so-far-discovered mesons, protons, positrons, negatrons, neutrons, or other “basic particles” may be, wave energies flow in the spaces between them. The demand for a wave-conducting medium requires that between said “basic particles” of matter there must still exist material. Our premise and its consequence are thus a direct contradiction of the ultimate truth and simplest meaning of the kinetic-atomic concept that all matter is made of spatially separate, moving ultimate particles.

In the last century it had been thought that a continuous material medium called “ether” filled space, and constituted a type of material other than solid, atomic particles. Large areas of theoretical, mathematical and experimental progress were mapped out confirming that idea. Then a critical experiment to measure certain consequences of these various conclusions was performed by Michelson and Morley. Their results threw doubt upon the entire structure of classical physics, and led directly to the Einstein theories of relativity and his denial that an ether exists.

Since our premise and consequence demand that material does indeed exist everywhere we must enter into a detailed examination of the reasons behind the original kinetic-atomic theory, some of the reasons for the postulation of a material ether, the details of the Michelson-Morley experiment and its premises, the logic of the theories of relativity and various other considerations.
Some twenty-seven centuries ago Thales decided that the road to understanding nature was by direct examination of things themselves. He and his contemporary, Heraclitos, proceeding in that spirit, soon noted that the most obvious essential item in nature is matter, and that it contains and undergoes change.

Along came Parmenides to introduce one of the first of the many paradoxes that have appeared in the field of theoretical philosophies of science. He argued that material is a physical reality of nature, and that its continued existence demonstrates that it is permanent. He then argued that a kinetic-atomic theory which said that nature is made of moving particles of matter can’t be complete.

“It was an event of no mean significance when Thales and Heraclitos observed the two extensive facts of stuff and change, and Parmenides noted that the fact of stuff involves the principle that the real is being as well as the principle that the real is physical.

“Once this was recognized Parmenides had no difficulty in proving that the two facts of stuff and change contradict each other, if nothing more is assumed. The proof is absolutely sound; and so brilliant in character as to be almost humorous. Change, he said, must be due to generation or motion. It cannot be due to generation for that means that the real changes its properties, and is incompatible with the principle of being which stuff entails. But neither can it be due to motion, if stuff is conceived as nothing but one physical substance or many microscopic particles. For motion requires that a thing moves from where it is to where it is not. If nature is nothing but the stuff which moves, there is no ‘where-
it-is-not,’ and hence motion is impossible. The difficulty is not escaped by regarding stuff as many, rather than one. For the motion of many particles involves a ‘where-it-is-not’ as much as the motion of one; a difficulty is not met by multiplying it many times. Moreover, there cannot be many particles if nothing but the stuff of the moving particles is supposed to exist. For manyness requires something to enable one to distinguish between one atom of stuff and another, and this is impossible if nothing but the stuff of the atoms exists. The essential point in the latter argument is not so much the need for an intervening space, as the necessity of something to designate the difference between one particle and another.”

The proof of Parmenides may have been “almost humorous,” but it is far from sound. It is unfortunate that this unsound conclusion should have come so early in the game. Its repercussions have clouded almost every major scientific concept since.

The clinching argument that compounded the error lay in the later contribution by Leucippos. He accepted the concept of solid atoms of matter, and added the concept that a physical void also existed. He thus introduced the idea of space, which he conceived to be an absolute void.

We might say that Leucippos completed the hypothesis which Newton uncritically accepted when he said at the end of his widely believed “Opticks”: “All these things being considered, it seems probable to me that God in the beginning form’d Matter in solid, massy, hard, impenetrable, moveable Particles, of such Sizes and Figures, and with such other Properties and in such Proportion to Space, as most conducd to the End for which he form’d them: that these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded of them; even so very hard, as never to wear or-break in pieces; no ordinary Power being able to divide what God himself made One in the first Creation.”

Even so recent a scholar as Eddington, in the 1929 edition of his book, “The Nature of the Physical World,” said, “When I think of an electron there rises to my mind a hard, red, tiny ball; the proton similarly is neutral grey. Of course the color is absurd—perhaps not more absurd than the rest of the conception—but I am incorrigible.”

If we were to assume with these noted men that the atomicities are hard spheres, and picture them as marbles in a glass, we can better understand the logic of Parmenides, Heraclitos, Leucippos, et al. It at once becomes obvious that in order for there to be more than one marble filling the glass, there must be a nonmarble otherness to allow of their separation and to distinguish one from

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another. Indeed, if the marbles were one solid unit filling all the volume of the
glass, there could be no-place-where-marble-is-not to allow motion within the
glass. When we shake the glass, however, we can note a change in the positions of
the individual marbles, and thus are forced to the conclusion that there must be an
otherness besides the stuff-that-moves.

Until very recently this logic was beyond attack. It still must be close to the
truth, since it yielded so many consequences so useful to the subsequent
development of scientific theory and application. Nevertheless, a close study of
the logic finds that it is based on a hypothesis that does not exist in fact.

The basis for the introduction of space between atoms was the assumption that
the atoms are ultimately rigidly solid.

Considering that the “atom” is now known to be made of smaller “basic
particles” and that such particles can be various distances apart within said
“atom,” it follows that such “atoms” are of variable size and shape, hence are not
ultimately solid, nor impenetrable let alone unbreakable or wearless. Allowing
that these “basic particles” are actually what the Greeks referred to as “atoms,” let
us consider the items rather than the words. The particles so far produced as
“basic atomettes” are known to be complex patterns of waves. They are known to
be interconvertible. They have been created out of “energy” and returned into
“energy.” They are none of the things Leucippos, Parmenides, Heraclitos,
Newton, or Eddington thought them.

These “atoms” have internal wave systems. They thus have internal structure
of a complex and variable form. They are thus variable as to size, shape, and even
identity and existence. Their true nature is known to be such as to make the
“proof” of Parmenides totally baseless, since they can themselves be intrinsically
fluid. As fluid items, atoms are capable of the everywhere evident act of moving
more or less easily upon themselves-by displacement, by self-compression, by
surrounding unit compression, by mutual transient distortion of shape and size,
and even by being of mutually variable identity.

It is necessary that when the size of a particle is variable, so is its density.
Particles of different intrinsic density will differ from one another even though in
contact. Particles with different intrinsic wave systems and densities will possess
an “identity” relative to each other, even though the material of which they are
composed is in contact. Fluid particles of variable density and structure can exist
and move upon one another without any intervening spaces.

If particles can exist in direct contact with one another; can, move amongst and
between one another without losing contact; can maintain identity through
difference of density and internal form; can undergo all actions that matter is
seen to perform; and can do all this with no intervening otherness, then there is no
need to defy the evidence of the senses to the effect that there is no void in matter.
The solid-atom-plus-void theory is unnecessary. The transmission of wave energies through “space” demonstrates that the atomic theory is not only unnecessary, but is actually untrue. Indeed, it is this very fact of the transmission of wave energies that led to the ether theories of classical physics. What were the steps that led science to deny the material ether in favor of the sense-defying void?
Chapter 13

The Ether-Drift Tests

It is our prime premise that every wave motion has a material conducting medium. The fact that even the ultimate “atoms” of the Greek philosophers are now seen to possess internal wave structure shows that even the basic particles of modern physics must have a material medium as part of their construction—as that component which carries, possesses and gives physical form to those waves.

Toward the end of the last century the crucial experiment was performed by Michelson and Morley, the purpose of which was to provide confirmation of the many branches of the theoretical understanding achieved under classical physics. The crux of that experiment was to determine the exact speed of the Earth with respect to the all-pervading ether. The premises of that experiment were the conclusions of the most highly developed, mathematically expressed and experimentally verified theories of that era.

Classical Physics

“The structure of physics at the end of the 19th century, which is more or less coincident with that part of the subject now usually, known as ‘classical physics,’ presented an impressive—apparently impregnable—facade to the scientist of the day. Indeed, it was often asserted that physics was coming to an end! The overthrow of this complacent idea has been so complete that physicists will, probably refrain in the future from repeating the error.
“Classical physics ‘had indeed achieved a remarkable synthesis. The laws of mechanics, combined with Newton’s law of gravitation, accounted for the motions of the planets and stars with almost perfect completeness. The laws of electromagnetism were adequate to account for all ordinary electric and magnetic phenomena and had predicted the existence of electromagnetic waves. By 1887 it had been shown that such waves existed, and later it was shown that they traveled with the same velocity as that of ordinary light. Indeed, by the turn of the century a great deal of the complete ‘spectrum’ of electromagnetic waves had been investigated.

“In spite of their almost complete ignorance of the properties of individual atoms, workers in the branch of physics known as ‘statistical mechanics’ had been able to make use of the atomic hypothesis in order to account for the most important properties of gases (in the kinetic theory of gases), and to a large extent for thermodynamic laws. This was achieved by combining the principles of mechanics with certain mathematical methods similar to those used by statisticians or insurance companies who have to deal with large populations. There was certainly good reason to think that most of the natural phenomena known to physics had been neatly identified, labeled, and correctly arranged in relation to each other.

“Nevertheless, there was no real synthesis between mechanics and the study of matter. Physicists were also somewhat self conscious about the lack of synthesis between mechanics and electromagnetism. For while all other known types of waves, such as transverse waves on a stretched string, or longitudinal sound waves in air, required a MEDIUM for their transmission, electromagnetic waves could travel through a vacuum. The difficulty had been so acutely felt that the term ‘ether’ had been coined for a hypothetical medium, of which no properties could be discovered besides its ability to transmit electromagnetic waves.

Relativity

“The theoretical structure developed by Einstein and usually known by the term ‘relativity’ is very little understood by the public, although highly popular. . . .

“The problem which Einstein set out to solve concerned the ‘ether,’ which was supposed to transmit light and other electromagnetic waves. What was the state of motion, if any, of the ether? It seemed unlikely in the extreme that the ether could always be moving exactly with the earth and so it must have some velocity, relative to the earth, which would be expected to differ according to the position of the earth in its orbit around the sun. Now according to classical ideas, the
transmission of any kind of wave motion occurs with a characteristic velocity relative to the medium; to any observer moving relative to the medium (such as an observer on a moving ship studying the velocities of waves on water the velocity would appear to be different. So the velocity of light would be expected to differ in different directions upon the earth, according to the direction and velocity of the ‘ether wind’ at the time (We are only concerned here with the velocity of light in vacuum, no with the changes in the velocity which occur when light passes through a transparent material, and which give rise to the phenomenon of refraction.) This would have many consequences which could be tested by observation. In 1887, the American scientists Michelson and Morley, in one of the most famous experiments ever performed, made direct test of the proposition that the velocity of light might vary according to the direction of transmission. They used a most sensitive and delicate optical instrument developed for the purpose, in which direct comparison could be made of the velocities of light in two perpendicular directions. This could have detected easily a difference equal in magnitude to the velocity of the earth in its orbit (about 1/10,000 of the velocity of light.) The result was entirely negative. Indeed, without now discussing all the other possible ways in which an ether wind might have been detected, it can be asserted that no generally accepted observations have ever been made which indicate that it exists.”

“At the very time when Galileo and Newton were laying the foundation of mechanics, studies were in progress as to the nature of light and the great discovery was made in 1676 by the Danish astronomer Roemer that light does not travel instantaneously from one point to another, but that it travels at a certain speed which, while very great—186,000 miles per second—is not infinite. Even in Newton’s day there were two theories as to the nature of light. The Dutch physicist Huygens regarded light as a wave of some kind, while Newton regarded a beam of light as a stream of very small corpuscles which were emitted by a luminous body. The masterly exposition of the corpuscular theory by Newton and the great authority of his name maintained the theory in a dominant position until the beginning of the 19th century when the work of Young in England and Fresnel in France completely displaced it and gave to the undulatory theory a dominance which it has held to the present time. According to this theory all space is filled with an ether which has the properties of an elastic solid, and light consists of transverse vibrations, like the waves on a stretched string, in this medium. Notwithstanding the properties assigned to the ether, large solid bodies, like the earth move through it without disturbing it in any way.

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“Another field in the domain of physics came into existence early in the 19th century with the study of the phenomena of electricity and magnetism. The master investigator in this field was Michael Faraday. The ideas of Faraday were developed and put into mathematical form by Clerk Maxwell, something more than sixty years ago. Maxwell showed that things happen just as though there existed at every point in the neighborhood of an electrical charge two forces, an electric force and a magnetic force, just as the law of gravitation states that at every point in the neighborhood of every particle of matter there exists a force which we call gravitation. It was found further that the ratio between the electrostatic unit and the electromagnetic unit was, within the limits of experimental error, the velocity of light in the ether. This led Maxwell to perceive that an electromagnetic disturbance would be propagated in free space with the velocity of light, and to conclude that light was merely an electromagnetic disturbance. Thus the theory of optics and the theory of electricity which had not been previously suspected of having any relation to each other, were joined together in a more comprehensive theory—the theory of electromagnetism.

“The success achieved by this theory in accounting for all known phenomena in its domain has been very great. It seemed about to rival in its perfection the attainments in the domain of Celestial Mechanics until Michelson performed, in 1887, what he himself has called his ‘unfortunate experiment.’ Just as the science of Celestial Mechanics rests upon a set of equations which result from the laws of motion and the law of gravitation, so the electromagnetic theory rests upon a set of equations given by Maxwell, who regarded the electromagnetic disturbances as being propagated in an all-pervading ether. The two sets of equations, dealing as they do with two quite different classes of phenomena, are naturally not at all alike. But there is one difference between them which has a philosophical significance. There is no suggestion that gravitation is propagated at all; or if one wishes to think of propagation, its speed is infinite; and the law of gravitation does not mention propagation. As a consequence of this the equations of Celestial Mechanics, which describe the motions of the planets of our solar system relative to the sun, remain unchanged whether the solar system is regarded as being at rest relative to the general system of stars or whether it is regarded as being in uniform motion along a straight line with any speed whatever. The equations of motion being just the same for the two cases there is no phenomenon in the system which would distinguish one case from the other. This is the old fashioned, Newtonian relativity, which is quite agreeable to the philosophical instincts of most people. A point of absolute geometric space has no meaning.

“It is different, however, with the equations of electromagnetism. These were based upon the concept of an ether which fills all space and which has many of the properties of an elastic solid. A point which is fixed relative to the ether can be regarded as fixed relative to absolute geometric space, since the ether is not
regarded as moving relative to absolute space. The velocity of propagation of the electromagnetic waves, including light, being constant relative to the ether, cannot be constant relative to bodies like the Earth which do not have uniform straight line motion relative to the ether. Relative to such moving bodies the electromagnetic equations are not the same as they are at rest relative to the ether. Since the equations are different one would expect the phenomena to depend upon absolute motion with respect to the ether.

“The very great speed with which light is propagated, however makes these differences, which depend upon the square of the velocity of light, extremely minute. Nevertheless, they should be measurable, just as the parallaxes of the stars are measurable. Very difficult to be sure, but still measurable. Michelson tried the experiment of measuring the motion of the earth relative to the ether with his newly invented interferometer, but the results were negative. The expected phenomena did not appear. He could find nothing to measure. Others tried similar experiments, but the results were the same; nothing that was expected appeared. It was a great blow to the theory, and the mathematical physicists were in great distress.”

The Michelson-Morley experiment is the point of departure between classical and modern physics. It is also the point of departure between both of those forms of physical theory and ours. It is thus important to our considerations and requires some elaboration.

“Let us consider briefly, therefore, some important advances in the concepts which underlie that subject which were made in the years between 1675 and 1750. This was one of the most important periods in the history of physics for during this time the foundation’ of our present day ideas of the nature of light and the manner of its passage through space were laid. In 1675 Newton communicated his theory of the corpuscular nature of light in which he encountered the difficulty of accounting for the gradual reduction in intensity at the edge of shadows.

Huygens in 1690 accounted for the bending of light by assuming a wave method of propagation. Roemer, just before this period, had satisfactorily proved that light does not have an infinite velocity and in 1728 Bradley made his celebrated observations on the angle of aberration of the fixed stars. Since the Bradley experiment is the starting point for the situation in which physics found itself at the time of the announcement of the Einstein theory we may stop a moment to consider it.

“If a ball thrower should throw a ball toward a moving railway car in which the windows were open, it is possible to imagine that the speeds of the car and the

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The ball might be such that the ball could enter the front window on one side and pass out the last window on the opposite side. Now a passenger on the car and the ball thrower would disagree as to the direction in which the ball actually moved. The passenger would certainly maintain that the ball was thrown in a direction diagonally across the car. In the case of the Bradley experiment the observer corresponds to the passenger and if he is to direct his telescope so that light from a distant star is to pass down the axis of the tube he must point his instrument ahead of a straight line connecting himself and the distant star. Six months later, when the earth is moving in the opposite direction in its orbit, he must direct his telescope at the same angle in the opposite direction. It is easily seen that the ratio of the velocity of light to the velocity of the orbital motion is the tangent of the angle of aberration. Bradley and astronomers until recent years have accounted for the results of this experiment on the basis of a stationary, or, as we customarily say, a stagnant ether.

“Now all went well until new phenomena were discovered and then arose the conflict which today we are attempting to explain by relativity. The phenomena referred to were those involving a slowing up of the velocity of light in media which are denser than air and the fact that blue light suffers greater decrease in velocity than the red. Fresnel offered as an explanation of these phenomena the idea that the ether in matter is denser than the free ether. It is easy to see, therefore, that if the Bradley telescope tube were filled with water the angle of aberration should be increased.

“This experiment was tried by Airy and Hoek and strange to say the angle of aberration was not changed. Of course it is possible that the matter filling the tube may drag the ether along with it just enough so that the velocity change by altered density of the ether is just compensated for. This gives rise to an ether drag theory. Fresnel derived a law in which the velocity, \( u' \), of the ether, that is the drag velocity, in relation to the velocity \( u \) of dragging matter, was expressed by the formula:

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u' = (1 - 1/u^2)u\]

“The Airy-Hoek experiment required, then, that the ether filling the tube have greater density than that outside and that either the ether inside is permanently attached to the tube and that tube and all move through the free ether like a tube of jelly moves through a basin of water, or else that the ether flows in at one side and out at the other crossing the tube with a speed less than that of the tube.
“In 1859 Fizeau in France devised an experiment to test the law of the drift of the ether with matter which had been proposed by Fresnel. As shown in Figure 13-1, light from a source S falls upon a mirror set at 45 degrees. From the mirror two beams of light passed through a lens, thence through apertures and through a water-filled tube. Another lens and mirror then caused the light beams to return through the tube, the paths being interchanged. It will be seen that the one beam traveled through the water in both directions with the flow of water, while the other moved against the stream. At the point of observation the crests and troughs of the light waves of the two beams came together in such a way that a system of interference bands was produced. Now when one of the beams was retarded over the other the whole system of bands move across the field of view. The arrangement was an exceedingly delicate one, and by it Fizeau found that when the speed of water reached 2 meters per second he could observe the shift while with 7 meters per second he could measure it. This experiment was repeated by Michelson and Morley in Cleveland in 1886 with precisely the same results. Apparently the correct conclusion to be drawn from the experiment is that an ether exists and that transparent matter carries the ether with it to a measurable extent.

“Fresnel’s theory also supposes that the ether outside of transparent bodies remains stagnant. To test this part of the theory was the aim of Michelson and Morley in their work published in 1887. This is the experimental work known as the Michelson and Morley experiment. (1) It was Einstein’s effort to explain the negative result obtained which in part gave rise to relativity.

“Light from source S in Figure 13-2 was divided by a mirror set at an angle of 45 degrees. The two beams traveled over paths D and D’ of an interferometer at right angles to each other. After re-traversing the paths the light was reunited so

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1 Hereafter referred to as the M & M test.
that interference fringes were produced. Any retardation of light in one path over that in the other was indicated by a shift of the fringe system. Since the velocity $u$ of the earth in its orbit carries the apparatus forward as shown by the broken lines, the effect is to increase the path $D$ by an amount $u^2/c^2$ where $c$ is the velocity of light. When the apparatus is rotated through 90 degrees the effective difference in path is doubled.

Figure 13-2.

“Michelson and Morley predicted a fringe shift of 0.4 of a band. The M & M experiment may be interpreted, therefore, as showing that, contrary to Fresnel’s hypothesis, the ether is carried along with the earth with a velocity between 3/4 and 5/6ths of the earth’s velocity.

“Due to the importance of the experiment as deciding against a fixed ether which so well explained the Bradley experiment, Lord Kelvin at the Congress of Physics in 1900 suggested that the experiment should be repeated with still more sensitive apparatus. This Morley and Miller undertook to do in 1904 and 1905. The fringe shift expected with improved apparatus was 1.5 bands. These experimenters announced as a result of the repetition, that if the ether moves past the earth it is with a velocity less than 3.5 kilometers per second; that is, the ether is carried along with 7/8 or 9/10ths of the earth’s velocity.

“Not completely satisfied that the small positive result was due to experimental error, Miller in 1921 to 1925 has repeated the experiment at Mt. Wilson and again
at Cleveland. The reason for choosing Mt. Wilson, where the elevation is 6,000 feet above sea level, was to see whether or not there is greater relative motion of the ether at greater distances from the surface of the earth. In all, 12,500 determinations have been made. The apparatus was used in such a way that a minimum fringe shift indicated the direction of the resultant motion of the earth in space and the maximum shift indicated the magnitude of the relative motion of the earth and ether. The measurements have been grouped so that all the data of a group have the same conditions as regards the known motions of the earth.”

After presenting graphical and schematic representations as to the results of Miller’s extensive studies, Professor Hufford continues,

“While the results of 1925 show more variation of direction still it is clear that there is a general shift towards the northwest. The fact that the results of the two periods agree inspires our confidence and we must admit that Miller has found a definite velocity of drift.

“It does not seem possible to attribute any of these results to experimental or other errors. In taking the data every precaution was used to remove the errors which might be caused by the mechanical disturbances, heat effects, and magnetic effects. Mirrors were changed, observers were shifted about, even the building was moved and differently oriented.”

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Chapter 14

No Ether?

We have here an interesting series of experimental results. They led to
Einstein’s theory of relativity, with its dependence on a non-Euclidean geometry
in which space and time values are thought to be intrinsically variable in nature.
Along with that theory of relativity, Einstein decided that since his geometrical
constructions do not require a conducting medium for light, nature itself has no
such medium. For no affirmative reasons, Einstein denied that an ether exists, and
science followed along his lead.

Our minute and detailed study of the logic, conclusions, and proofs of the
Einstein theories of relativity revealed so many logical errors, flaws, and
inconsistencies, and so ill-defined and approximate a series of “proofs” that we
find Relativity irrelevant to any understanding of the mechanism of gravity and
the workings of nature.

Since the M & M test is the point of departure between classical and relativity
physics, as well as of this book, let us carefully examine the various allied
experimental results discussed in Chapter 13. We found:

1. The ether between the stars is at rest (Bradley telescope).
2. The ether in a room on earth is approximately at rest to Earth (M & M).
3. An ether is the light wave conducting medium (Maxwell, et al).
4. When the ether moves, light speed alters also (Fizeau, et Fresnel, et M &
   M 1886).
5. At various altitudes, careful tests do show variations of light speed
   depending upon the direction of the light beams (Miller, 12,500 times).
Although these results were the direct stepping stones to the Einstein denial of a material light-conducting medium, there is nothing in them to affirm so odd a conclusion. We therefore emphatically refuse it! Instead we shall have to look at the very premises of the M & M test so as to discover the unrecognized reasons for the positive discovery that the light-conducting medium is approximately at rest with respect to instruments in a laboratory room on earth. When we do that, in the light of modern data and information, the correct answers fairly scream at us.

The first correct answer is that the ether is not an elastic solid. It is an elastic fluid. This answer should have come prior to any questionings of the premises themselves, since under any theory, a solid pellet (atom) moving through a continuous material background (ether) must displace and deform that background material very readily, else be hindered and constrained in its own flight. Any group of such atoms (Earth) moving as separate particles but in perfect positional harmony through such an ether must deform, compress and displace said ether so readily and easily as to ensure that this ether is extremely fluid, rather than solid.

The premises of the M & M test were:

1. Ponderable matter is made of solid, pellet-like particles called “atoms,” which are everywhere in motion.
2. A continuous material medium called “ether” is a generically different kind of material which fills all space and is motionless (elastic solid).
3. As a wave, light is conducted by that ether at a speed which is always constant with respect to that stationary material.
4. Arithmetic and geometry are infallibly applicable to natural events. This implies that the principle of addition and subtraction as of velocities of motion of a conducting medium and waves in it, holds true, as well as that the classical principle of relativity also holds.

Accordingly, it was thought that the concourse of solid atoms which comprise the earth and everything ponderable on it moves through an all-pervading elastically solid ether at a certain speed. That speed was considered to be “absolute,” in that all motion was considered to have absolute meaning as compared against the stationary background ether. It would then follow that if light moves at a set speed in the ether, its measurable speed would vary according to the motions of the measuring instruments. Measuring the rate of variation of light speed caused by the motion of the earth would thus provide data from which
simple calculations could provide the absolute speed of the earth. That absolute speed could then be used as the base against which to measure the absolute speeds of everything in the universe as a path (at least in principle) toward total determination of all past, present and future actions in nature.

The M & M test demonstrated that no such absolutes apply. Furthermore, various other experiments, not yet discussed herein, demonstrate that the ether is not dragged along within the earth, between the solid atomic particles. (It will not do to claim that a solid ether is motionless in interstellar space (a la the Bradley telescopic tube tests), but that it moves along within the confines of kinetic-atomic earth a la the Airy-Hoek inconclusive experiment. That possibility was explored, tested and discarded long ago).

II

The second and major answer is that it is the atomic theory that is false, not just the solid-elastic ether theory. Yes, it is the very kinetic-atomic theory itself which is the ultimately false basic concept in the M & M test as well as in all basic theories of nature. (This denial of the kinetic-atomic basis as the structure of all matter may be absurd, at first glance, but becomes overwhelmingly more simple and evident on mature contemplation.)

Again we say, the kinetic-atomic theory which has ultimate particles moving in a void (or through a generically different background material) as the basic component of nature—is false. It is only false as an “ultimate” basic concept. There are, of course, atoms. There are protons. There are neutrons and electrons, whatever they may turn out to be. But whatever these true “atoms” may be, they are not the basic items out of which all material objects are made. Instead, it is they that are composite items, made out of the more basic stuff. Matter itself is prior even to these “basic” particles.

It is given by the various experiments discussed above that light waves are carried by the ether, that said ether is stationary between the stars and Earth, but that Earth does not move through the ether, nor is said ether dragged along with the earth. We recognize that even between ultimate atoms (be there any) a conducting medium must exist, wherefore the last sentence poses what appears to be an impossible situation. It seems that the ether must, at the same time, be cosmically motionless, be moving with the earth, not moving with the earth, move within a body of flowing water, but not be moved by the flowing atoms that are that body of flowing water.
The long road towards the solution of this paradox begins with the particle-versus-wave aspects of theories as to the nature of light. In modern theory light is alternately, or complementarily, considered to be a wave system in the electromagnetic spectrum or else a particulate flow of “photons.” Various experiments demonstrate that it is the one, various others that it is the other. In each such experiment light can be either a wave or a photon, but, it is thought, not both. What, then, is a “photon”?

Comparing various formulae as to the actions of radiation in closed systems and the actions of gases in similar closed circumstances Einstein “inferred that the radiation behaves as if it consisted of $E/\hbar v$ quanta of energy or photons. (Note—The word ‘photon’ was actually introduced much later, namely, by G. N. Lewis, Nature, 18 December 1926; but it is so convenient that we shall adopt it now.) Now it will be remembered that according to Planck’s theory, a vibrator of frequency $v$ can emit or absorb energy only in multiples of $h v$. Planck regarded the quantum property as belonging essentially to the interaction between radiation and matter; free radiation he supposed to consist of electromagnetic waves; in accordance with Maxwell’s theory. Einstein in this paper put forward the hypothesis that parcels of radiant energy of frequency $v$ and amount $h v$ occur not only in emission and absorption, but that they have an independent existence in the aether.”

What does this reveal? Simply that the photon itself, the light “particle” is a moving packet of waves with a frequency $v$ and an amount of energy $h v$. It means that the “photon” is a system of waves! Whereupon we recognize that even when a “particle” light, is still a wave!

Light, then, under whatever guise or experimentally oriented treatment, is ultimately a wave system. Our prime premise says that such a system requires a conducting material medium, and it is our understanding that such a medium exists with or without the presence of material particles, of any magnitude. Such a system, in short, requires a material ether pervading all of space. For a correct theoretical development as to the nature of reality, we must coordinate all of the heretofore discussed experiments, plus any others, into agreement with this fundamental requirement.

With respect to a representative “atom,” the electron, “Theory indicates that, if the electron be accompanied by a train of waves (which it is), it must be vibrating in unison with the waves. It follows that the electron must have a structure, and thus, even experimentally, it ceases to be the ultimate unit either of matter or of electricity. . . . Mathematical investigation shows that the energy of the product of

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the momentum of the electron and the wave-length is a constant. Since in the atom there are only certain wave-lengths and frequencies, the electronic momentum can have only certain values, and must increase not continuously but by jumps.

“The interpretation given—provided a dual-nature for the electron—a particle (or electric charge) and a train of waves. Schrödinger --- goes further, and resolves the electron itself into a wave system. Thus, a quarter of a century after the atom was resolved into electrons, the electron has been resolved into an unknown source of radiation, or a disembodied wave-system. The last trace of the old, hard, massy particle has disappeared, and the ultimate conceptions of physics seem to be reduced to mathematical equations.”

More modern studies of atomic structure have brought forth well over twenty “basic particles.” All of these particles are known to possess wave-system structure, all are convertible, all can be created and/or dispersed. Furthermore, it is known that the size, mass, wave length, and characteristics of these “basic” particles vary according to the strength of the gravitational field of the stellar body on which they happen to exist. It follows that, in principle, properly controlling the choice of gravitational field strength enables the physicist to create “basic particles” of every continuously variable magnitude. While it may be true that lasting particles of only certain size can be created on a given world-planet, an infinite range of such particles can be created under varied gravitational field-strength conditions! The limitation on size of subatomic particles is an accident of location, not an ultimate fact of nature.

The facts of nature show that there is a physical material which is everywhere the carrier of the many wave-train systems which come in every size and frequency in different places, under differing conditions. The fact must also be that this material is intrinsically a compressible, expandable fluid if only because it can form into such wave patterns.

Let the Michelson-Morley experiment be seen in the light of reason.

What really happened? What is the truth?

The truth is: There is no change in the speed of light, regardless of its direction in the experiment.

That being so, it is impossible that any Lorentz-Fitzgerald contraction occurred in the measuring instruments. Had those contractions occurred, while light speed remained constant, interference results would have followed. The truth is: No interference results obtained.

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Let the experimental results be believed, and let the demands of reason also be allowed. Let it be admitted and accepted that for any wave there must be a material that conducts and is that wave.

Let us now set up our own premises for the M & M experiment, using as our base the matter-unit understanding to be found in a later chapter.

Premises:
1. All energy, whether motion or pressure, whether particulate, wave, or a combination of both, requires a material vehicle.
2. Matter is a basic item of nature, made out of nothing other than matter. Matter has two forms, continuous and discontinuous. Continuous matter may be called, “ether,” and discontinuous matter is particulate portions of that ether. Matter, in whatever form or state it may exist at the given zone, is the vehicle for energy.
3. Matter is continuous where it is not discontinuous, and is continuous when it is particulate. Said again, solid matter has no empty spaces within it. It follows that even though there is an ether, that ether cannot flow through solids. It also follows that since the earth, for instance moves through the cosmos, thus necessarily displacing the etheric matter filling the inter-atomic zones out in space, then the ether is neither stationary nor motionless.
4. The principles of mathematics are rational inventions. Although it is our opinion that they should maintain constant measures in order to maintain understandable conclusions, we find mathematics a type of description of nature which will work equally well topologically inversioned as when correct.
5. If light is carried by whatever material happens to be present, its speed will be constant only with respect to its conducting medium, and then only if the density of that medium is constant.

With these premises and immediate consequences let us see what Michelson and Morley did.

1. Since they went to extreme lengths to avoid any motions or vibrations of their apparatus, even to the extent of mounting the stuff on a stone afloat in a pool of mercury, we may assume that the experiment was performed in a closed laboratory chamber through which no breezes might wander.
2. They did (or might) perform the light ray actions in a “vacuum.”
3. They sent a split light beam in two absolutely different directions and back to a common sighting device, at which they arrived simultaneously.
Discussion

Since they were in a closed, solid-walled chamber, it follows that nothing could have been moving through the room. Since everything except the light rays maintained a condition of rest in that closed chamber, it follows that the light-conducting medium (which in this case was the ether filling the “vacuum,” the various mirrors, the sighting device and the eye of the observer) was at rest.

Result: The fact that the light-conducting medium was at rest must lead us to predict the results of the experiment, namely, the light moves at the same speed in all directions. No interference.

Argument Contra Our Conclusion

How can it be said that “the light-conducting medium was at rest?” Even if it is granted that these premises are correct, that solids are not mostly nothing and that matter conducts light waves, are not the apparatus, the room in which it exists, and the planet on which it sits all in motion with respect to the Sun, the Moon, and Spligus?

Answer:

Yes. Everything which is part of the matter-unit “Earth” is in motion relative to everything in the rest of the cosmos that is not a part of this unit. There is the relative motion we have heard so much about. The amount of that motion is obviously as variable as it is relative, depending strictly upon which outer unit we arbitrarily elect as our frame of perspective.

However, if we wish to know what we are talking about, if we wish to arrive at sensible answers, we must define our terms to accord with nature. Absolute motion of any item can only be its motion with respect to its contiguous surrounding material environment. So, for absolute rest. Plus.

That absolute rest and absolute motion thus occur I freely concede. When absolute motion is a fact, Einstein’s theory of relativity applies, with the minor stipulation that time and distance be held constant. When only relative motion prevails, relativity is false. Hmmmmmm.

In any event, once we recognize the solidity of solids, and their ability to act as real walls of real rooms, we can also admit that there was no absolute local motion on the part of the light-conducting medium of the M & M experiment.
Once we recognize that, then we must also admit that there was no Lorentzian contraction.

Having admitted that, we may then also admit that there could be a Lorentzian contraction whenever there is absolute motion of any material unit. We might even admit that whenever absolute motion takes place, the thing that moves sets up a disturbance in that through which it moves—its contiguous material environment. And now let us admit the experimental as well as theoretical finding that there is an upper limit to the speed of any absolute motion, where that limit depends upon the density of the surrounding medium. We might say that there is an upper limit to the speed at which a material medium can be displaced, where the value of that limit varies as does the physical condition of the medium.

Example. Given two lights, traveling in opposite directions from a common starting point. The absolute speed of each light will be that of the speed of light. The relative speeds of the two lights with respect to each other will be twice the speed of light. Obvious. They will leave each other at twice light speed, but each still moves at light speed. Under no circumstances can either light be taken as at rest, though, since both are in absolute motion in a common medium.

Now we must focus our attention upon a detail of that M & M reconstruction. After allowing that they had established a “vacuum chamber” as the vehicle of the moving lights, it was suddenly stated that this vacuum chamber was actually filled with continuous matter, the “ether.” How did it get there?

It couldn’t have flowed through the walls of the room, or of the vacuum chamber, else not only our premise 3, but the results of the experiment are denied. The only way that the ether (continuous matter) can have gotten into a vacuum chamber is that it always was there to start with. How could that be?

The error of the classical premises lay in the concept that solid matter is mostly empty space, thus permeable to any flowing medium. Once it is recognized that solid walls are material-filled, it must be realized that if a fluid continuous material is left filling any evacuated chamber, it must necessarily have been there to start with. It couldn’t have entered later, nor been flowing through at first.

If a continuous material cannot enter a closed chamber, yet remains behind after as much air as possible has been removed, then it follows that the air itself must always have been the continuous material. There is a trifle too much positive evidence that atoms and molecules exist for us to deny that there are such particles. And the evidence is equally strong that air is molecular-atomic.

We find then that (1) air is molecular-atomic, and (2) air is a continuous material. It follows that while air may be a continuous material, it is not
homogeneous. It also follows that non-homogeneous continuous air is made of continuous-material atoms and molecules. Thus that atoms are continuous material within themselves and are contiguous to each other. The air is thus a contiguous-continuum of non-homogeneous atoms and molecules. As some of the air is evacuated from any chamber, the remaining matter-units will obey the basic property of all matter by expanding to fill the space.

In the M & M test the failure to detect a variable light speed was due to the fact that there was no variable speed. The implied failure to detect the ether drift was due to the fact that at Earth level conditions there is no ether drift.

But just because there is no ether drift through the material-filled solids of the walls of the chamber neither proves that there is no ether nor does it prove that light has no conducting material medium. No more than it proves that the Earth-unit is motionless in the cosmos.

That a solid is not filled with liquid matter is no surprise. That a continuous liquid is not filled with flowing gases is no surprise. Why, then, should we expect all three states of matter to be filled with the free form of that second primary form of the same matter of which they are themselves powerful concentrations?

The free ether is to be found only where the other states of matter aren’t.

M & M Replayed

We start out with a matter-unit, the Earth. Within the confines of that unit we set up a laboratory, which is at rest. The walls of that lab are of solid matter, and have no holes in them. Although a very fine examination of the solid walls would show them to be made of molecules and atoms, these fine structures are also continuous material within themselves, and are either a part of one another or are touching. Thus, though the matter is filled with variations of density it nonetheless fills the volume of the wall and is not permeable to the atomic and molecular material of the outside air. That outside air-material is the only material contacting the outer walls of the lab. (Just as a tree is what it seems to be, macroscopically, even though composed of myriads of cells, microscopically, so a solid is as it appears to be even though it too is composed of parts.)

Within this closed lab room we float some apparatus on a pool of mercury (to avoid even the vibrations of the floor of the room), carefully assure that nothing moves in the room which might disturb the apparatus, and then we send a light ray moving. We set up our apparatus so as to split that ray, send it in two different directions at 90 degrees to each other, then reflect and re-unite it in order to pass it through a viewer. If we choose, we even enclose the apparatus in a vacuum.
chamber. (To evacuate this chamber we use suitable pumps to pump out as much of the air as possible. Note: Never all.)

Based upon the anatomy of nature we expect that the light conducting medium in this experiment is whatever material happens to be present along the path of the light. Under the conditions of the experiment we recognize that all of that material is at rest, both to itself, to the apparatus and to the parent matter-unit (Earth). We thus expect, and find in the experimental result, that the speed of the light is constant, regardless of its direction.

Recognizing the reality of solid walls, setting that reality against the fact that everything within the limits of matter-unit Earth moves as a unit-whole macroscopically, and with the center of Earth as the at-rest referent for local motions, we must then recognize that if there is a free ether that ether cannot normally exist as a stationary medium through which Earth flows. That medium cannot be said to be in relative motion right through the earth and its parts. It isn’t. Hence, the M & M experiment never really was any sort of test of the free ether. Nor can the results of that test, be considered as any kind of denial of the existence of such a medium. Indeed, in the light of our new premises and understanding of the structure of matter the M & M experiment would have been too ridiculous ever to have been performed. Imagine: A complicated, expensive, enormously difficult and exacting test for an etheric effect on light, where the ether is not present and if it were, conditions are scrupulously set up so as to eliminate the very effects sought.

Further, once we allow that a free ether does exist, but insist that it is a form of matter which exists, like all forms or states, only where the others are not, then we must admit that the solar system’s ether is displaced by the absolute motion of the Earth through it. In short, the ether must flow around the Earth, being, at its closest, beyond the troposphere, forming standing-traveling waves ever at rest to Earth, being ever displaced, compressed, and never cosmically at rest.

With reference to the "evacuated chamber," you will note that such a chamber is obtained by withdrawing as much of its contents as possible. No one has ever claimed to have truly emptied a chamber of even its gaseous atoms or molecules. They have claimed, though, that the remaining matter-units are as widely spaced (relatively) as would be a few flies scattered about in Grand Central Station. They would and have claimed that between these units exists an absolute void.

The fact that wave energies can traverse even the most strongly evacuated chamber, as well as they reach through the farthest portions of the interstellar cosmos, leads us to insist that not only is there a real and physical-material filling all spaces but that this continuous material (ether) is the very same substance as are all matter-units. That’s why it always remains to fill any evacuated chambers. There is only one “matter,” and all objects are made of it.
It follows that any gaseous atom is gaseous per-se. It must be so if it always expands to fill any given space. The gaseous state of matter must therefore be an ultimate reality itself, which means that in a gas every matter-unit is itself gaseous. (In a liquid all would be liquid, and in a solid, all solid.) Again we find the kinetic-atomic theory in error.
Chapter 15

Either Ether or Absurdity

1. A transparent jar of air transmits light. It is known that air is a mixture of gases, and that those gases are atomic and molecular. The results of the aforementioned experiments told us that such kinetic particles neither move through a stationary ether nor drag such an ether along in the jar. No ether, as such, can thus be present.

2. We evacuate the jar. It is true that it is physically impossible, in practice, to remove all of the atoms and molecules of gas, wherefore it is possible—even probable—that the remaining wave-system-of-electrons-protons-etcetratons-material-conducting-medium expands so as to fill the jar. If either this does happen, or we did, in principle, remove every last atom, then it still happens that light will traverse that jar. If light is conducted through an atomless jar, then ether must be in it.

3. The M & M test conclusively proved that the ether cannot in any manner have flowed through the walls of the room and thus through the walls of the jar. Any ether that remains in the jar after the atoms have left must, then, have been there all along. But this contradicts the last sentence of paragraph 1, above.

Ether is present after atomic air is eliminated.

Ether is not present when atomic air is present.

Ether cannot pass through solid, so as to flow into the closed jar after the air is eliminated.
Where does the ether come from, and how does it get into the jar? The problem is clearly stated.

Let us imagine such a glass jar. Inside that jar we place a piece of ice. We evacuate that jar. We now have a jar with a piece of ice on the bottom and a vacuum above. Soon we find that in the jar we not only have the solid bit of ice, but we also have some water and a glass full of water vapor. Where oh where did the vapor come from? And how did the water enter the jar. Did they flow through the solid walled jar? Is it possible that between the solid flitting atoms of ice there was condensed some water vapor? And some water? Or is water and water vapor a background medium in which atomic air exists? Was the water vapor always present in the air, and thus became all that remained in the vacuum jar after the air atoms were removed?

These questions are obviously ridiculous. Obviously, the water “arrived” when the ice melted. Obviously, the water vapor “entered” when the ice and water evaporated. The water vapor was consequent to the removal of air. It was not present all the time. It was neither stationary nor dragged by the air molecules. It didn’t “enter” through the walls of the jar.

So for the ether. The ether filled the vacuum jar only as it was released from the organized forms of the matter units (atoms, molecules) of air as the internal ether pressure within that jar decreased during evacuation. The ether “sublimated” out of the atoms occupying the space.

The liquid appeared as the solid melted. The vapor appeared as the solid melted and evaporated. The ether appeared as the solid, liquid and gas pressures became so low as to approach the (incalculably enormous) pressure of the etheric medium of the solar systems interstitial zones. When that pressure is approached the conditions in which free ether can exist are thereby approached. At that time, the free ether appears.

It appears out of the bodies of the departing matter units.

When the theory of relativity first appeared it soon developed that major theoretical and philosophical changes in basic concepts were consequent upon apparently innocuous and simple statements. So must it be here.

The analogy just given in regard to ice and water vapor as compared to ether and air contains an enormous oversimplification. You see, for the known states of matter to be interconvertible required no difference whatever in the nature of the component parts of such matter states. In the kinetic-atomic theory, the atoms are considered to be essentially unchanged, as between solid, liquid and gas states of a given material. The difference in state is considered to be a difference in

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1 This sentence will be understood the next time through the book.
distance between particles that atomically compose the object. The difference in distance is considered to be the result of a difference in the amount of “attraction.” “Attraction” is left unexplained, hence a mystery. Thus, the modern theoretical “explanation” as to the difference in state of materials is constructed upon an unexplained mystery. Nevertheless, differences and interconversions between these known states of matter are intrinsically, essentially and specifically not the same as a conversion from an organized matter-unit component of a material into a non-organized amorphous form of free matter (ether).

You see, for an atom, a molecule, a matter-unit of any sort at all to be convertible into ether demands that the matter-unit is composed of ether to start with!! If this be the case in nature, and modern science denies that such an ether exists, how great must be the lack of philosophical understanding of nature on the part of modern theoreticians!

II

We will consider the various experiments again.

The telescopic tube demonstrations of aberration (on page 96) conclusively show that the earth does move with respect to the stars, and that the ether between earth and stars is (in effect) at rest. We accept that fact. The flow of water demonstrated an effect upon the speed of light moving within the water, ‘and we accept from this the conclusion that when the light-conducting medium is in motion relative to the measuring equipment, there is a corresponding effect on the measurable speed of light.

The M & M test showed that there is no change in the speed of light in a closed chamber here on earth, regardless of direction of that light. We accept from this the positively demonstrated fact that in such a room the light-conducting medium is at rest with respect to the apparatus.

When a telescope is filled with water, no change in the angle of aberration of the stars occurs as compared to an unfilled telescope. We accept from this the evidence that the physical conditions of apparatus within the confines of the earth are largely independent of the conditions of the material of interstellar space. (The path of light rays in space remains the same, no matter what we do to the apparatus for viewing those beams here on earth.)

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1 In this respect, the word “atom” refers to whatever smallest particles the modern physicist is considering, since “atom” here is that ultimate particle that the ancient Greek philosophers first postulated.
After deliberating the evidence of these many experiments, we do finally conclude that there can be only one basic raw material in nature. That wave-conducting material must fill all space, and must be shaped into the lasting configurations which compose what we call “ponderable matter.”¹ A careful consideration of all the ether-drift tests, then and now, and of all the other types of tests similar to those so far discussed shows one common factor that has been ignored or misinterpreted because of the age-old kinetic-atomic theory. In all said experiments it happens that wherever a solid-walled object is interposed somewhere in the tests, no signs of free ether-drifts occur. No signs of any kind of material penetrations occur. There are simply no materials that normally flow through a boundary material of greater rigidity and denser structure. We recognize that the M & M test demonstrates that there is no ether flow through the planet Earth. We so conclude on these grounds.

1. They measured equal length paths.
2. They sent split light beams along these equal length paths, to rejoin after traveling equal distances in equal times.
3. They enclosed their tests within solid buildings, carefully protected from any vibrations to ensure that nothing within the confines of that room moved lest disturbances be set up to interfere with the lights.
4. They ran the tests and found that the lights moved the equal distances in equal times.

This demonstrated that:
1. The test worked well, and was properly set up.
2. The apparatus was of constant lengths in all directions, and nothing happened to time.
3. No material light-conducting medium flowed through the room to alter the apparatus or the light speeds.

Or, in short, in a closed chamber on earth, at sea level, the light-conducting medium does not move, nor do the instruments alter in length, nor does anything happen to time, clocks, or pointer readings. What happens on the moon, or the stars, was not pertinent to this M & M experiment. The choice of geometrical systems had nothing to do with this experiment. The theories of Fitzgerald contractions, the equations of Lorentz and/or the Einstein theories of Relativity never really “solved” the “negative” results of M & M because none of the premises those deep-thinking men tried to accommodate, were present in the M & M test,² with its positive demonstration of a relatively motionless conducting medium.

¹ Such organized configurations of patterned material are what are herein called “matter-units.”
² See page 102 for the M & M premises.
The earth is not a concourse of spatially separate atoms. There is no stationary solid ether through which such a collection might have moved. There should therefore be no alterations in light speed, according to its direction in a room. The principles of relativity, of addition and subtraction of velocity, of alterations of time and space did not and do not apply in any such tests. The test results of M & M were positive confirmation of the foregoing.

It is therefore our thesis that a continuous material ether fills all space in the known cosmos; that this ether is an amorphous, fluid, material substance; that this material is everywhere and always the conducting medium for energies; that this material varies in density when the pressure alters; that in response to such alterations of pressure and density certain self-persisting units of material occur; and that such units, always contiguous either to each other or to ether in unorganized free form, are the “atoms” out of which “ponderable” matter is made. It follows from this that in a structure composed of molecules, the material of the molecules fills all the volume of the structure, and when the structure expands or contracts, its component molecules (and atoms, and protons, electrons, neutrons, etc.) expand and/or contract (else voids would appear); that in a “liquid” structure, the molecules are themselves liquid, in solids they are solid, and in gases the components are themselves intrinsically gaseous. Finally, we shall find that the free ether exists only in the depths of outer space, remote from stars and planets; that this ether grows denser as we approach any such large matter-unit; that gaseous atoms and molecules begin to appear as we approach closer to the gravitational fields of such matter-units; that gaseous atmospheres eventually are found closer in to such units, atmospheres in which the gaseous components fill all the space; that when such gases condense and liquify, the molecules have themselves therein become denser and liquid, to flow around each other as a body of liquid possessing no inter-liquid-molecule spaces within or through which gases may flow, or ethers; and that when such liquids condense and solidify, no empty spaces exist within crystals of such contiguous solid molecules.

We suggest, as the result of these concepts, that in a world so made there can be no ether-flow through a Michelson-Morley experiment and that therefore we must expect no changes in speeds of light through zones of ether carefully maintained in an enclosed motionless state, even at the least dense condition possible to our Earth-level manufacture.
If our thesis is correct so far, then we cannot rely upon many of the concepts and word-meanings passed down from ages ago. Not even those that have been refined by the most modern techniques. Indeed some of the old-new epistemologic difficulties that stood in the way of understanding nature may now finally accompany the kinetic-atomic theory as to the ultimate structure of matter into an honorable grave.

It was the Greeks’ kinetic-atomic theories which first cast doubt on the validity of sense evidence. In the previous chapters these various reasons for doubting the validity of the senses have been shown up as themselves invalid. In this attempt at a complete general understanding of the workings and mechanism of nature we take the position that comprehension and understanding may take place in an inexplicable fashion, but that all of the raw material for reason comes from a real outside world by means of the accurately reporting senses. On the belief that understanding of the results of complex abstraction of the highest level can follow only if the earliest concepts are themselves understood, and that these early concepts are understood only by having been directly experienced through normally functioning senses, our novel definitions start from and ever refer to sense evidence.

These definitions are intended as descriptions of the items in nature that the words represent, thus are explanations as well as definitions. Matter, ether, energy, matter-unit, cad, abram, densa (densum), inergy, exergy, sorce, and perhaps a few other words and items are the ones to be spun together. For it is
now time to light the incense lamps and watch against the mouth of the cave as the ghostly-glimmering theoretical form appears.

**Matter.** Matter is that substance which occupies what would otherwise be “space.” It is the stuff with which we are familiar as the essential part of tangible solid, liquid or gaseous objects. From long sense-evidence experience with it, all of us know what is here meant by “matter.” Matter has two forms, amorphous and particulate. A “particle” is a portion of material that maintains a lasting identity as a bounded and persisting piece. Matter has three arbitrarily recognized states, when particulate; solid, liquid and gaseous. These states of matter are known by their difference in degree and rate of flow, by their maintaining given shapes or not, by their maintaining given volume or not. The amorphous form of matter is fluid. The forms and states of matter are interconvertible, i.e., solids, ds, and gases are changes of state interconvertible into each other, and particulate matter, as atoms, molecules, etc. can have its organized form destroyed so that the material becomes formlessly amorphous. Similarly, under the influence of certain patterns of energy, segments of formlessly continuous matter can attain a lasting configuration so as to become particulate.

The properties of matter are that it is expandable and compressible; it persists eternally and it has extension. These attributes belong to matter regardless of its form or state, as passive properties. Under certain circumstances matter may possess, as a further basic property, the capacity to be conscious.  

**Energy.** Energy is motion and/or pressure. The two are interconvertible. The vehicle for energy, that which is pressed and/or presses, that which moves and through which motion takes place, is matter. Motion, which is any change of position from any here to any there, is known to us through immediate experience of it. It is totally independent of any mathematics or definitions in words. Pressure is any affirmative linear tension of a nature related to a squeeze.

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i Editors Note: In a unified, holistic model of reality there can be no absolute dividing line between causality and consciousness, but in explaining the basic mechanisms of physical reality, from the quantum to the cosmos, the constructions in this book do not treat the mechanism of consciousness.

ii Editors note: The newer, more precise definition of energy is this: “Energy” is the ability to do work. That which possesses this ability is matter. That which provides matter with the ability to do work is the difference in degree of organization of different portions of matter. That difference is the result of the interplay of motion, pressure, and dinsity of matter.
Through direct sense experience of matter, motion and pressure we know what they are in the only possible way. They are here called to your attention as irreducible basic items of nature.

It is readily apparent that the material substance which moves and/or presses is not interconvertible with such motions or pressures. Matter and energy can’t possibly be interconvertible.

**Matter-unit.** In nature there are several self-perpetuating configurational patterns into which matter and its contained energies will form. These patterns repeat at various sizes, and represent very specific levels of organization into “matter-units.” The level of organization (a hierarchy of size, depending for actual value on the equilibrium between “particle” and field conditions of the locale) consist of atoms, molecules, molar bodies, planetary systems, solar systems, stellar systems, galactic systems, island universes and the cosmos.

We have as our one recognized premise the assertion that every wave motion has a material conductor. We found its prime consequence to be that since wave motions go everywhere, material must exist everywhere. It is now time for our one essential basic hypothesis, a hypothesis which I thought original as of ten years ago in 1954, but which was introduced, even though remotely, at least as long ago as 1911. “Planck’s Second Theory” of black body radiation showed that at absolute zero temperature the mean energy of an oscillator is 1/2 hv. “This was the first appearance in theoretical physics of the doctrine of ‘zero-point energy’ . . . and in 1916 W. Nerst suggested that the aether everywhere might be occupied by zero-point energy.”

**Sorce.** “Sorce” is a basic pressure. It pervades the entire known cosmos as a background positive omnipresent pressure which tends toward linear constancy everywhere. The existence and omnipresence of sorce is responsible for the other half of the equilibrium which makes possible the persistence of matter-units. Sorce is variable, though it tends ever toward constancy. The actions required to achieve such constancy of sorce spread at finite speeds. Sorce thus never succeeds in becoming everywhere the same. Sorce is a continuous pressure that exists independently of particulate bombardments, although it is affected by such motions. It exists and presses in all directions whether particles are present or not. Matter exerts and contains that sorce-pressure.

**Ether.** Ether is the amorphous form of matter.

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There is a duality in the considerations as to what is or is not “ether.” As we shall see, there is no place in the universe that is not, to some extent, part of some organized matter-unit. Hence the amorphousness of matter is partly a point of view from a certain perspective of size. To an electron, moving within a material-filled shell of an atom, the material of that shell is outside of the configuration constituting that electron. To that electron, said material has no form or shape, but is a continuous material, an “ether.” From our molar point of view, however, the material shell, including its circling electron, is part of a particle, the “atom.” Said atom is part of a particle, a molecule. The “particle” called Earth moves through a sun-oriented configuration of material, which to us is a continuous amorphous ether. When we examine it further, however, we find that it has structure. It conforms to the pattern found to exist in common for all matter-units, and is thus part of the “particle” called “solar system.” To some extent, then, the ether exists both everywhere and nowhere, depending on the size of one’s elected frame of space. To that extent, “ether” is but another word for “matter.” It has the additional connotation, however, of the continuity-aspect of ubiquitous substance, even though that continuity may be limited to within a given particle.

**Inther.** Ether that has been organized into a persistent shape, a form, may be considered intrinsic material to the particulate object so formed. Such intrinsic ether may be called “inther.”

**Exther.** Extheric material is all material not a persisting part of a given unit. With respect to that unit, then, all extrinsic ether is “exther.”

It is pertinent to point out here that the actions of energy are, to some extent, dependent on the relations between the levels of organization of matter-units that are involved, as well as on the anatomy of a given unit. Each level of matter-unit has its being within and as part of a larger, higher level unit. What is a field of energy around one such unit is an intrinsic energy within the form of its larger, “parent” unit. Furthermore, since the actions of energy, as to size, speed, strength, length, etc. are directly dependent on the level of matter-unit involved, there are as many secondary levels of energy as there are levels of organization of matter-units. (Heat, electricity, magnetism, valence, gravity and “resorce” are examples of secondary forms of energy, as will be demonstrated.)

**Densum.** In considering the actions of matter-units, a steel cube for instance, we must consider not only its motion, but the effects of that motion on the material-filled space through which the cube moves. For instance, if a one-foot cube moves through a medium at 10 feet per second, it will have displaced at least 10 cubic feet of medium per second. But “10 cubic feet of medium per second” is a
variable quantity, depending (for absolute amount of material displaced) upon the
density of the material in the given space. Since we long since recognized that
matter fills all space, and is intrinsically a compressible fluid of variable density,
it follows that absolute density is not measured by numbers of matter-units in a
given space, but is instead represented by the total amount of all matter in that
space, hence requires some term that denotes a certain total amount of material
per unit volume. We shall use the term, “densum.” A “densum” is that amount of
continuous ether which would exist within a cubic foot volume maintained at
Earth surface level ideal conditions, and emptied of all organized matter-units.
The plural of densum is naturally, “denса.”

Dinsity. Dinsity refers to the denseness of non-particulate matter.¹

Abram. With respect to the above cube, moving through a space filled with
material of some concentration or other, we may wish to specify the absolute rate
of motion of the cube. We do so by specifying the number of denса displaced by
the cube per unit time. Thus, the “abram” of anything represents its absolute rate
of motion in denса per second. (It might be wise to point out that “density” itself
may be stated in denса. Since ether is compressible, it follows that a number of
denса may exist within a cubic foot of volume. Indeed, the nucleus of an atom
contains perhaps billions of denса of material. It might therefore be wiser to allow
a denса to represent the amount of ether that would exist in a 1-micromillimeter
volume, rather than a cubic foot, where that volume is filled with ether at a
concentration equal to that which exists in a single proton central core at earth-
level conditions. It is the idea of a denса, rather than its quantitative (arbitrarily
agreed upon) value that we here introduce.)

Cad. In considering absolute motion,ii and abram, we must adopt an arbitrarily
finite spatial volume as the focus of our considerations. A volume filled with a
medium of whatever density happens to be present in the zone under
consideration. The zone is a real zone, but its size is arbitrarily fixed by us. The
material medium which fills that imaginary “cavern” shall always be the
background medium in our discussions of absolute motion, abrams and number of
denса involved in the actions considered. It thus is of some importance that we
know the density of our cavern, as well as the position, hence state of motion, of

¹ “Density” is mass per unit volume. Non-particulate matter has no mass. “Dinsity” is thus required
to denote amount of ether per unit volume.

ii We shall discuss the meaning of “absolute motion” later.
that cavern relative to the sequence of matter-units as well as relative to other caverns elsewhere. We must know the nature of our “cad.” The cad is the cavern density, in densa, of any specified zone in the cosmos, and includes said zone itself.

Energy is motion and pressure. The two are interconvertible. The vehicle for energy, that which presses or is pressed, that which moves and through which motion takes place, is matter. For anything to move there must be a displacement, a change of energy, of the surrounding material environmental medium. Hence, whenever one type of energy is present (motion) surrounding energy fields also must be present. In nature there are many levels of organization into which matter, and its contained energy, will enduringly form. The actions of energy, i.e., its paths and effects, often depend on the relations of the matter-units present and their effects upon the structure of the material medium through which the energy passes. There is a circular cause-effect relationship between the structure of the material field and the paths and presence of energy therein.

There is also a true relativity involved in the actions of energy when matter-units of different levels are mutually involved. There is a relational duality: What is intrinsic energy to one level of matter-unit (a nucleo-protein molecule) is extrinsic energy to a component, smaller unit (a hydrogen atom it possesses). The intrinsic energy of the solar system is a field of energy to the planet Earth.

ENERGY AND EXERGY

The intrinsic energy we shall entitle “inergy.” Extrinsic energy we shall call “exergy.” What is inergy to one level unit is exergy to all components. What is inergy to a component unit, however, is still part of the inergy of its parent unit. An important point to note, here, is that the component units of a larger matter-unit are the material field within that larger unit, hence are the conducting medium for all energies present in that larger unit. Hence, the extrinsic energy of our above nucleo-protein hydrogen atom is nevertheless present within that hydrogen atom even though it is an extrinsic form of energy so far as the hydrogen atom is concerned. The general field pattern of a matter unit (its inergy) is controlled by the anatomical structure of that larger unit, and pervades all component units as though they were a continuum. Hence, there can be many differently patterned fields in a given unit.
We shall see that every matter-unit is an equilibrium pattern between a contained amount of intrinsic energy that moves in certain paths which are controlled by the dinsity pattern of that unit, which dinsity pattern is in turn a result of the relation between the locked-in energy and the surrounding sorce. We may abstract from this concept the idea that every matter-unit has an “inergy field,” an intrinsic patterned flow of energy throughout the entire form of that unit.

Consider several units, each representative of a successively higher level matter-unit. For instance, matter-unit A, an atomic component of matter-unit B, a molecular component of unit C, the earth component of unit D, the solar system
component of unit E, the Milky Way Galactic component of etc., etc., a component member of unlimited X, the cosmos. Take under consideration the inergy field of unit B. The fact that a bit of the inergy field of unit B can exist throughout the body of subordinate unit A means that the inergy-field pattern of density of that unit A is conditioned by the exergy of A into minute deviations from the normal A inergy pattern. The fact that the parent unit B of such a subordinate unit A may be part of another, higher level unit C, which is part of a D, etc., etc., means that a number of different density patterns (each dependent for its form upon the overall inergy of successively larger cads and matter-units) may co-exist within any given unit. Further, the exergy field of any unit A remains at its relative position in the cad of the parent unit B, even when component A therein moves away. Thus, the inergy field of a unit will always remain with that unit when it moves, but the exergy fields that exist throughout the bodies of such units will vary in pattern within that subordinate, according to the variations of position of such subordinates with respect to the parent unit to which the exergy fields of such units A are inergy fields.

These considerations, difficult though they may be to follow, are the direct route toward a unified field theory. Much remains to be done ere such a theory may be qualitatively considered. Let us do it.
It is necessary to create a new theory as to the structure of tangible matter in its particulate form. The old atomic theory was demonstrated to be wrong, through the Michelson-Morley tests. The ether vortex theories of Descartes are presently held in disrepute. The idea that matter is made of atoms, atoms of subatomic particles, and subatomic particles of energy basically failed to explain matter for two reasons. First, there was no accompanying definition or explanation as to what “energy” is, and second, when we recognize that energy actually is motion and/or pressure we recognize that tangible matter cannot possibly be constructed solely out of such items. What moves or presses?

There are some deeper problems also to be faced. If energy really is merely motion and/or pressure, then how can motion be discontinuous, or pressure (when it is a steady tension rather than a bombardment) be particulate? In the terms of our explanatory definition of energy, there must be a severe misconception present in quantum theory, within whose domain energy is treated as discontinuous particulate units which are the building blocks of nature. The continuous field versus discontinuous particle aspects of the present concepts of the structure of physical reality keep popping up in many wave-versus-particle conflicts which were riot resolved merely by admitting that both are incontrovertible. There is urgent justification and merit to this effort to rebuild a physical theory with no such inconsistencies as presently exist in a physics built on the two contrary legs, incomplete quantum theory and false relativity theory.
We shall start our considerations with a discussion on the actions of a completely continuous ether with a constant sorce in a given cad. We know that moving fluids, or even moving solids, encounter changes in pressure against their surfaces in proportion, to their rates of motions. A spinning baseball, for instance will follow a curved path because there is less pressure on the faster moving side than the slower side, relative to the line of flight of the ball. Similarly, an airplane wing is so designed that the top of the wing has a greater surface area than the bottom, so that the airflow must move faster across the top than across the bottom thereby causing less pressure on the top than on the bottom, and thus creating “lift.” Similarly, the use of this Venturi principle has numerous applications in our everyday machinery, in which the flow of gases or fluids is used to establish a decreased pressure relative to that of the atmospheric constant pressure so as to cause a “suction.” In all such instances, the “suction” and “lift” is always really a positive pressure, which comes from the surrounding environment.

So it is with our sorce and ether. When local sections of ether move, they undergo changes in surface pressure relative to their surrounding ether, and since matter in any state or form is basically compressible and expandable, such pressure changes will I be accompanied by dinity changes of the entire etheric component in the cad. A dinity change anywhere in our continuous ether causes a local variation in the value of sorce. Since the sorce tends everywhere to equalize, and since sorce is pressure, it follows that any local pressure changes will cause a sequence of events concerning variations of dinity of contiguous ether (as well as movement of such transmitting media) which will spread endlessly away from that source.

Therefore we recognize the existence of a Venturi effect as a basic effect in our ether filled cad, when any local motions introduce any local changes in the universally constant sorce. (Note that we admit that although sorce tends to be universally constant, it never succeeds in fulfilling the endless actions and movements of material required to accomplish such a tendency. Nevertheless, we feel it proper to refer to a “universally constant” sorce even though it may not precisely be so.)
If we have a certain number of densa of ether in a cad, and we cause some of that ether to condense into a certain small corner of that cad, the remaining ether must expand to fill the space, and there must temporarily exist a decrease in pressure of that less dense ether whilst more ether flows into the cad from outside it, so as to equalize the sorce. See Figure 17-1.

In the left-hand diagram of Cad A the ether is evenly dispersed at a densa of 100 and an even sorce of 10 pounds per square inch. In the right diagram we collected half the ether at the center, so that there is a densa of, say, 500 there. The remaining ether must expand into the space, so as to have a densa of, say, 25 and a sorce of only 5 pounds per square inch.

As this would immediately create an imbalance of pressure at the zones where the boundaries of our cad are placed, we must expect that ether would then flow towards the concentration core until the sorce was again 10. This flow must then continue out from the cad forever, decreasing in intensity and differential with the square of the distance from the core as the circumference of the circle of effect enlarged with the distance. During the tiny interval that this cad imbalance persists, however, you may note that the ether flow into the cad will be towards the core, perpendicularly to, rather than parallel to the surface of that core. (The parallel cannot borrow from its adjacent ether since that ether, also on the parallel, is under the same decreased sorce.) There will, then, be temporary imbalances and differentials of tension and/or pressure in a given zone of ether (Z) as between the line perpendicular to the core and that parallel to it. It is a fact that because of the

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Editors Note: Think of a set of imaginary concentric spheres centered on the core with increasing or decreasing sorce values to each sphere—a simplified spherical gradient. Any line that follows the direction of the surface of any concentric sphere is "parallel" to the core and any line in a radial direction from the core is perpendicular to it.
Physical relationship involved, pressure can be renormalized by ether flow perpendicularly into a zone, but not by a lateral flow around the zone (ignoring Venturi effects for certain patterns of flow).

III

In accord with the considerations in paragraph I, above, that the line of flight of bodily objects will vary according to the pressure differential across that flight path, we expect that the path of a pressure wave similarly will vary as does the density of the traversed medium. (We know that refraction—bending of the path of electromagnetic waves such as light in response to alterations of the density of the conducting medium—is a fact.)

It follows that a pressure gradient will cause a curved flightpath of waves of pressure and/or units of particulate matter. The waves are local condensations of ether, hence will be conducted by the traversed medium. The particles will displace the traversed medium.

IV

Let us consider traveling pressure waves through a continuous ether in a uniform cad. Even one such wave will cause numerous effects in the cad as it passes through. That wave will represent the equivalent of the core in Figure 17-1, except that it will have introduced a temporary excess or deficiency of inenergy in our cad, depending on whether it is an influx or release of energy. Considering the actions of such a “negative” pressure wave, of (say) 10 pounds moving through a cad of 20-pound sorce-type pressure, we would find that as the zone of 10-pound pressure arrived at a given spot, the adjacent ether, impelled by that local pressure imbalance, must flow into the zone, thereby moving the decreased pressure a bit further on, and on, and so on. Also, since the pressure differential must exist on both sides of the zone of 10-pound pressure, some flow must be expected in both directions into the temporary zone of differential, wherefore a very numerous series of local waves back and forth, vibrations, must accompany the passage of such waves. (Once a positive pressure wave had departed far enough from its source so that the excess backpressure no longer existed for it, it too should find such vibrational effects in its traversed ether.)

We should expect that a positive pressure wave would curve towards the side of greater density in a cad with a density gradient, since the greater density zone with greater inenergy would satisfy the abram in a shorter distance than in the lesser density area. Conversely, perhaps, (perhaps not-try it to find out) a “negative”
pressure wave might curve towards the side of lesser density since it would more rapidly be compensated on the greater pressure-density area, hence might move faster along the line drawn through that side. In either event the path of energy will vary according to the density of its traversed media.

V

Again let us consider our cad. This time allow two such waves, with their vibrational side-effects, to enter. What had been a uniform etheric field at first, has now been altered for each wave system by the presence of the other. Each is itself a disturbance of ether density and pressure. When they are close enough to each other, each becomes part of the traversed field of the other. Given that a sufficient number of such wave packets pass a given point at proper equilaterally separate angles so as to curve each other sufficiently that each curves through all the others the amount required for all to chase each other into tight globular patterns, what could result?

Each wave system represents a zone of greater ether density than its surroundings. They pass closely enough to each other, and at such an angle to each other, that they find themselves entering a medium which is no longer (approximately) homogeneous. They curve in the direction of greater density (and each of them is actually a density configuration), thereby entering into and through one another. But as soon as they pass through each other, the direction of greatest density is changed, for each wave, wherefore it curves back again. (It is to be expected that enormous extremes of density variations must exist in extremely small distances, for these curvatures to be sharp enough to maintain such wave systems in closed systems . . . and it is gratifying to note recent findings that the density of the fluid nucleus of atoms is such that minute volumes of it would weigh billions of tons.)

After a moment these waves will find themselves in the position of a number of snakes all trying to swallow the one in front, with the last one trying to swallow the first, but in three dimensions rather than two. The prolonged activity of such waves within a zone of specific material would soon cause the ether in question to have assumed a lasting delineation from its surroundings, an identity. (Indeed, it is quite possible that the wave systems that initiated this setup would have all been moving at light speed, than which nothing can move faster, and that their intercollisions would initiate internal Compton effects which would set up Compton effects within Compton effects as the wave energies found themselves forever trapped within each other in that small cad. The p-s (page 303) nature of electromagnetic waves, to be presented later, also would play a vital role in establishing this matter-density-energy-path circle of self-containment.)
Each of our wave packets represents an autonomous pressure carried by whatever local portion of material is present. When several such waves trap each other within our given cad, they draw into the equivalent of a central node much of the local ether. They create the effect on the cad shown in diagram 2 of Figure 17-2. The sorce-satisfying flow of ether into the cad must follow. Our cad would be rapidly differentiating from the homogeneous continuous ether we had started with, into a dense zone of high-energy material which would have begun to assume some sort of identity relative to its environment. It is to be expected also that the p-s effect would have created a number of recurring particles of short duration within the core zone of intercruving energies, wherefore portions of material would physically enter into the whirling motions of the wave energies, thus to establish a zone of spinning material filled with internally rotating wave systems surrounded by a shell of ether of greater density than that of the basic environmental ether. (These etheric density changes, result from Venturi effects of sorce, when spinning particulatenesses appear.)
Consider now the results upon the surrounding material of a spinning core of material and of a single wave system moving within that core. Our cad shall be a relatively homogeneous ether under a constant sorce. The core may be considered as a nucleus since it is well differentiated from its surroundings by its excess density, by its inergy and by the specific local rotational motion its material.

First we shall consider the effects introduced by the spinning action of that nucleus. According to our previous considerations in regard to Venturi effects on pressure-systems, we expect that there will be a pressure differential introduced at the surface of the spinning nucleus, between the outward pressure of the spinning ether and the constant inward sorce-pressure of the stationary ether. Since the average sorce throughout this cad remains constant, while the local pressure at the interface of nucleus-surroundings shows a Venturi decrease, we must expect a local flow of ether towards the nucleus, until the sorce equalizes.

In diagram I of Figure 17-2 there is a constant sorce of 100 pounds per square inch except at the surface of the spinning core, where the spin effect is that the pressure will drop to, say, 50. In diagram II the ether of the cad has begun to move towards the nucleus, under the impulse of the external sorce-pressure of 100. In diagram III the ether has condensed around the core sufficiently to restore a steady cad pressure of 100. Obviously at this point a disequilibrium of pressure must exist at the internal nucleus-ether side of the intersurface. The ether within the spinning nucleus might now begin to flow towards the surface, but since a very finite amount of ether (inether) exists in that nucleus (as compared to the infinite expanse of material outside the cad, that can supply ether) the entire internal pressure of that nucleus must drop as soon as some of its material flows towards the boundary. Indeed, we might obtain a local condensation at the very surface, but this can in no way equalize the sorce. The only way to restore a constant sorce of 100, even through the nucleus, is for the nucleus to shrink! Under the pressure differential, under the pressure from the sorce of its surrounding etheric environment in the cad, this is precisely what must be expected. The nucleus must shrink, condense, and thereby introduce density variations into the cad, especially within itself.

So much for the spinning core and its Venturi effects, for the moment. Let’s take up the single wave system, moving within this nuclear core. Again we must recognize that a local Venturi effect will be initiated by the swift motion of that wave system against the environmental contiguous etheric matter. (It makes no great difference whether we consider the wave sequence as equivalent to the vibrational forms of a struck violin string, which string is in the form of a closed circle at the periphery of our nucleus, or if we consider the wave sequence a series of pressure waves moving in bundles in a line drawn perpendicular to those wave fronts, but in the same peripheral circle. The fact of the rotation of the entire core will provide similar effects to the cad, in either event.)
In diagrams I through 5 of Figure 17-3 we have our spinning nucleus with a wave sequence moving within it in the direction shown. (The zone of calm is an idea of what may exist at the center of such a spinning core, and it is taken from considerations as to how the ether would start to flow towards the core surface in response to the sorce-drop caused by the spin. This concept is also taken from considering the structure of a hurricane, with its central, low pressure “eye.”) At point A we show that the ethereal environmental medium (which is already denser through its reaction to the spin of the core) begins to move towards the area of the fast moving wave pressure system. We take this from the effect of motion on pressure, where faster linear motions cause decreased lateral pressures. At A, then, the wave system induces a local pressure decrease which causes sorce of the cad to push ether towards the core at A.

**Figure 17-3.**

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i See Chapter 43, Refractions and Reflections.
In diagram 2 the wave-system (node) has moved to B, and the local ether at B has begun to flow towards it. At A, meanwhile, the ether has stopped flowing. In diagrams 3 and 4 the node is at C and D respectively. The ether at A has begun to return to its prior position and that at B to stop (in diagram 3). In diagram 4 A does reach and cease moving at its prior position while B starts returning and C stops flowing inward. A study of all these four diagrams as parts of a moving picture sequence most revealed by diagram 4 will lead to the recognition that this entire layer of ether, which decreases in density with the square of the distance from the core (according to our considerations re the spinning core) will begin to have a wave vibration moving around through it, where the wave system will set the entire layer of ether vibrating like a struck metal disc. (When an entire layer vibrates that means that a series of waves are simultaneously moving throughout the layer. Such a simultaneous series requires that there must be a whole number of waves existing in that layer at any moment since it is impossible for part of the material to be in the two-places-at-one-time required for fractions of waves to exist therein.)

We take from these discussions the idea that where the circulating node of the nucleus passes any given zone of the surrounding etheric layer it will act as a moving particle-wave which will cause a decreased lateral pressure and an increased line-of-motion pressure. Upon finding a decreased pressure against it, the zone of sorce-impelled ether will begin to flow towards the nucleus. When the circulating node passes that site, the pressure will revert to the higher level, and the amount of influxing ether will now be surplus. It will return to its starting position. In order for a specific shell-layer of surrounding medium to become involved in this perpetual ebb and flow it is necessary that the circulating nuclear-node return to its starting point just as the shell of continuous material returns to its starting point.

It is easily seen from this that in short order the surrounding shell material will have begun an overall resonance in harmony with the nuclear-node. We thus expect such a circum-nuclear shell-layer to always have its own specific resonance frequency, that this frequency represents the whole number vibrational form that always exists in such shell, and that the thickness of such a layer, and of its nucleus; and the speed of the circulating node, as well as the frequency of its shell-layered-surrounding matter; and the density and gradient of both nucleus and shell will all enter into a sorce controlled, cad dependent quantitative equilibrium for a matter-unit to have come into existence and persistence.¹

¹ With a few more factors introduced into these considerations it may be possible for those interested in quantitative statements to arrive at equations for all this. See Chapter 43.
Figure 17-4 A and B represent a series of sound waves in a “sound box”, within which a layer of fine sand or lycopodium powder on its floor forms into patterns of standing waves when sound waves pass through the box, hit the far wall, and bounce back through the box. The timing is such that the returning waves intersect the arriving waves at the same places in the box all the time, setting up permanent, or “standing wave” sequences at those places. Similarly, a rubber rope tied to a wall and set into longitudinal wave motion can have the wave sequences bounce back from the wall and travel back through the rope to set up a stationary standing wave series in the rope. Similarly, controlling the exact wave length and timing and resonance distance can set up standing wave series in which the nodes move along the rope at any speed, where that speed is completely independent of the actual speed of the original wave itself. (These standing waves and nodes are presented in any competent high school physics book.)

In diagram C we picture an etheric pressure wave. When such a wave, which is a local condensation of material, passes a given zone of ether there must be a reverse flow of that ether back where it started. Since such a motion cannot ever merely cease (lest energy thus be destroyed if for no better reason) it follows that a reverse wave must thus be initiated, a “feed-back” wave moving in an opposite direction but with the same wave length as the primary wave.

In diagram D we present the concept of a closed chamber so shaped as to copy our etheric shell of diagrams 1 to 5, and filled with a density-gradient which can steer the internal waves so they remain within it. We show that the inset C represents diagram C, and that a reverse feedback wave will be induced in that chamber which will again resonate into nodes moving, or standing, within that shell. The rate, size, wave length, and other physical characteristics of such nodes also will depend on the factors discussed with respect to quantitative considerations.
These little nodes certainly can exist only at certain set distances relative to such nuclei and circum-nuclear shells, and they would represent energy configurations in a material that is not a permanent part of that configuration. They could not, therefore, be considered as true matter-units. Wavicles, aye.

It would appear that the wave sequences represented in diagram D must rotate through the spherical shells around the nucleus, bouncing back and forth from the shell density-energy boundaries much as electromagnetic waves bounce from the Kennelly-Heaviside layer around Earth. It would follow that when there is more than one such etheric shell layered around a nucleus, waves of varied wavelength and amplitude would remain within the bounds of shells of correspondingly varied density-energy, wherefore each shell would have an individual mode of vibration natural to it alone.

It is to be noted that the vibrations of such a shell, with the discrete portions of ether thus set into a patterned wave form, will delineate such a shell. That shell layer will nonetheless be in contact with its own environment, which still is the ether of the cad. It follows that the ether of the cad must be affected by all these vibrations, so as to find itself also induced into various motions. In such a system as this, where the chamber (closed etheric shell) has a resonance wave node series circulating within it, as well as an ebb and flow of the "walls of the chamber," it is to be suspected that our local node systems will be a series of small sphericles, rather than the circles demonstrable by sound wave standing-wave patterns on the floor of sound boxes.

VII

Should we elect to consider this system in its entirety, an "atom," we would find that the nucleus of said atom is a material substance possessing wave motion within itself as well as rotation of itself. In response to the bodily rotation of that nucleus the surrounding material, sorce impelled, will condense around it, where the degree of that condensation will decrease in intensity with the square of the distance from the nucleus (merely because that is the manner in which a stimulus will spread out and be satisfied in three dimensional extension). The condensed surrounding shell of material will also undergo an overall vibration in response to the circulating nodes within the nuclear material. In response to the timing of that vibration, sections of the surrounding material will be delineated from one another, and the density arrangement must therefore show a fine-scale departure from the overall square-of-the-distance density gradient.

The only thing that stops such shell systems from extending ad infinitum about such an atomic nucleus is the existence of other nuclei, and other matter-unit energy effects, all competing for the same cad. Every matter unit nonetheless
must, by its own physical activity within and against its surroundings, act to some extent as a new “nucleus” all over again.

Consider the actions of Earth as a typical matter-unit moving through a continuous exther which is at rest relative to a parent unit. Along with the rotation-sorce-Venturi density pattern there will be displacement effects through the surrounding ether caused by the passage of Earth along its orbit. The density pattern caused by rotation plus the density pattern caused by displacement-compression will take the form of shells in depth, plus doughnut-shaped rings whose plane would be perpendicular to the path of orbital flight. These shells are both material and energy densities.

This shell pattern is one which has Earth as its center. Thus Earth must be considered the special or “privileged” frame of space. The material medium in which these density shells exist, however, is at rest with respect to the Sun (when we are at a sufficient distance from the planet). The force pattern which is at rest relative to Earth is thus in motion through its material component. Example:

Given a ship moving through the ocean. Given that a wave is caused by the passage of the nose of the ship through the water. The wave so caused will remain a constant distance from any given portion of the side of the ship, and is thus at rest relative to the ship. That is, the wave pattern is fixed, hence at rest, relative to the ship. It is a “standing wave.” The same wave, however, is in motion through the water of which it is composed. Relative to the water, it is a “traveling wave.”

For our purposes we shall consider such systems as representing “standing-traveling waves.”

Note that the shell-layer material around our spinning cores varies in density, growing denser as we approach the core. Note that the core itself must have contracted, thus increased a rotational motion to maintain its angular momentum, then found its increased rotational speed to have reintroduced the original sorce imbalance, hence found itself contracting again and again, until it must attain enormous density, where that density still exists in a sharp gradient. The fact of such gradients must again provide a physical cause for the curvature of the paths of inergies so as to maintain them within the density-causing pattern. A matter-energy cause-effect configurational circle. A matter-unit. These curvatures of the shell inergy in response to density gradients cause departures from the even rate of density decrease, since at certain distances from the core the inergy of local shells has curved enough to be moving parallel to the core, hence sets up its own Venturi core-effects, thus inducing successive outer shells. There should therefore be sets of concentric density-energy shell layers around such nuclei, whose physical characteristics will be intimately related to the inergy and nodes of the nuclei as related to the sorce level at that place. See Chapter 33, Inx and Rinx.
Chapter 18

Matter-Units

“Oh, I count most discourse taint. We hint: No ties ruin us.”

The cosmos is a matter continuum. This means that matter is everywhere, at every spot and dot of nature. There is no void space in existence. This does not require that matter is homogeneous, however. Matter is not everywhere the same density, nor the same tension, nor temperature, pressure, color, state, figure. There are many differences in this material. It is only the basic substance itself that is interchangeably the same. The substance is changeless in its basic properties, but it is subject to endless varieties of change in the things that can be done with it, within the limits of those properties.

Discontinuities appear. Pebbles. Planets. A bee. A bubble. Stars. How can there be discontinuities if the universe is a continuum? If “continuum” implies uniformity rather than mere continuity, we shall have to grant that the word does not apply. There is not uniformity, just continuity. Even the discontinuities are in
direct contact with material of other shape, form, or state. They are contiguous to other material. \(^i\)

In its discontinuous form matter is found as configurations which are continuous within themselves. The configurations which persist in nature are not limited as to size. They fall into a small number of hierarchical groups, which are herein named “matter-units.” Each successively larger level unit is composed of a partial merger of numerous lower level units, whose inergy and inther reorganize into a new, larger whole. Once formed, any unit may assume any of the three recognized physical states-solid, liquid, or gaseous. The difference between these states of matter-units is one of quality of each component unit, rather than number of (solid) units per unit volume.

The classic kinetic-atomic theory said that all matter is made of (solid) atoms, which move through either empty space or a generically different substance called “aether.” On the contrary, while all “atoms” are made of matter, matter exists whether atoms are formed out of it or not. Whether patterned into lasting units or not, whether particulate or formless, matter possesses its basic properties, is always the conducting medium for whatever energies exist in the given place, and is present in every place. It is a basic item of nature, made out of nought else, convertible into nought else, eternally and changelessly that physically material substance which can be known to us only through our own personal sensory experience of it.

A matter-unit is a self-perpetuating inther-inergy pattern. \(^ii\) Under the influence of the basic sorce, a rotating portion of ether will attain a great dinsity (see Chapter 17). A graded dinsity pattern of inther will cause a curving path of its inergy such that the inergy remains within the dinsity pattern. Simultaneously, said inergy pattern sets up the Venturi imbalance (relative to the overall sorce) which causes the steep and enormous dinsity pattern of the inther. ‘This

---

\(^i\) If “continuum” means uniform, then the cosmos is a “contiguum. (For the purpose of this work, we elect to consider that a “contiguum” is a “continuum,” in that even though there are numerous separate particles many different states and shapes and densities of contiguous matter these many items all directly in contact with more material make up a continuity of material throughout space.

\(^ii\) Any “particle” is similarly an inther-inergy configuration.
represents an inther-inergy cause-effect circle which is found to be repetitive at the various size levels of the matter-unit hierarchy.

There are two general forms into which the matter-units fall. They are the mono-nucleated atom-form and the multi-nucleated molecular-form. The mono-nucleate form is that of a dense central nucleus with a series of surrounding material shells of variable density and pressure. The multinucleate form is that of a plurality of mono-nucleated forms whose outer shell-layers have partly or completely merged into a new inther-inergy pattern in equilibrium with two or more nuclei, and surrounding them. The multi-nucleated unit may have any of several methods of combination of its component units: (1) The outer layers may merely merge at their touching zones; (2) the outer layers may actually flow together into a new arrangement of inther-inergy shells surrounding all components; (3) a unit, or units, may be taken bodily within the shell-layer system of another unit, lodging within one layer of the larger unit; etc. When any of these junctures take place a new inergy-inther harmony must seek equilibrium with the overall conditions of the cad. Usually there will be inergy and inther imbalances in this new configuration. Such imbalances will find redress and equilibration with the cad through a release or gain of energy and/or material.

Since the material units which persist for any long periods fall into various size levels, it follows that there are various equilibrium stages, where the amount of energy and the amount of matter are of such quantity, and such an organized form, as to be able to influence their environment into a harmonious physical condition for their continued existence. It follows, also, that between these levels, matter and energy are not in equilibrium, and will not persist in any mid-way pattern for long.

There are relatively few such levels of organization, where each level has very many members.

The Levels of Organization of Matter-Units.

Matter-Unit No. 1. The atom.
Form: Mononucleate—central nucleus with surrounding shells. The spacing of the shells follows a set pattern.
Matter-Unit No. 2. The molecule.
Form: Multinucleate—constituents, atoms, and molecules. In a molecule, the atomic nuclei still persist, and usually some of the atomic shells persist around those nuclei. But the outer shell matter and energy of the component atoms have flowed together to form a new shell pattern such that there are continuous shells surrounding the whole collection, making of them one unit. From the outside, a molecule presents the same outer surface tension shell layer as does any single atom. The nature of the molecule depends on its own outer shells, rather than the
types of atoms within it. The nature of those outer shells, however, is the resultant product of the component atoms’ matter-energy rearrangement, hence is conditioned by the component structures which provide its matter and energy. Mergers between atom and atom, atom and molecule, and molecule and molecule thus take place in the same fashion.

Matter-Unit No. 2A. The molar objects.

The molar body is a unique category. It has no general form. It is made of atoms and/or molecules which have joined outermost surface tension shells so as to form a unit which persists. A diamond is an example of such a molar unit. Though not completely merged, the component carbon atoms have joined their individual outer, surface-tension shells. To some extent, the diamond even has the many shelled system of a regular matter-unit, as shown by the fact that there are lines of cleavage in it. The fact that the outer shells of the component parts of a diamond are joined is shown by trying to rejoin a cleaved diamond. Although the two sections may be perfectly approximated, they remain two, rather than one unit. Solid-state units cannot be joined into one because their outermost material shells do not flow and merge into one another, except under very high pressure.

Stones, boulders, raindrops, nails, plants, and animals, etc. are examples of molar body units.

Matter-Unit No. 3. Planets, stars, and solar-type systems.

Form: Mononucleate.

Matter-Unit No. 4. -Star systems (binary, trinary, etc..)

Form: Multinucleate.

Matter-Unit No. 5. Galaxies.

Form: Multinucleate. Even a galaxy has its own continuous outer system of regularly patterned shells.

Matter-Unit No. 6. Galactic systems. Composed of a plurality of galaxies related to each other and mutually surrounded by shell systems.

Matter-Unit No. 7. The cosmos.

Since the term “cosmos” embraces all that exists in nature, it follows that no matter how large any finite galactic unit 6 may be, something lies outside of it which must continue infinitely. That infinitely extending thing is the body of the cosmos. Hence, being by definition infinite, the cosmos cannot really be considered a matter-unit. (There is no frame of reference against which it would be a particle.)
Figure 18-1.

In Figure 18-1 it is seen that there are always some nuclei, that the nuclei are surrounded by material shells-in-depth, that said material is everywhere, and that said material represents a continuous ether even though it may be constrained into these various patterns. An “ether shell-layer” of, say a star system, or of the planet Earth, is composed of masses of smaller units (as for instance the atmospheric layer of Earth is molecular-atomic gas).
The physical causes of the structural patterns of the matter-unit hierarchy are the same, regardless of the size of the unit. These causes, which will be further analyzed later, are the relations between sorce, spinning cores creating Venturi-effects which allow contraction of the cores plus inflow and density increase of the surrounding material, and the compressibility of basic matter itself.

Since sorce is everywhere, spheres are the same and circles alike at any size, and Venturi effects always present for the same reasons, the ratio of shell-layer pattern sizes should be the same, regardless of the size of the matter-unit. There should be a ratio of shell layer patterns to which all matter-units conform.
Chapter 19

The Milky Way—A Molecule

It is time for the introduction of some common data regarding the structure of various units not presently called “matter-units” although they are such. The data are presented as evidence that matter-units do conform to a common configurational pattern, and that this pattern is the one we had built up as the resultant of the relations between spinning units of material within a contiguous environment of generically identical material under a common sorce. It is our view that all matter-units\(^1\) have a spinning core, where that core is the equivalent of a single “particle” even though that core be the planet Earth; that all such cores are nuclei within a contiguous material environment which acts as a continuous medium even though it may sometimes be composed of contiguous particles itself; that this environment is constrained into certain thick layers, or “shells,” of patterned density and energy by the existence and actions of that core in relation to the field pattern and sorce pre-existing in that cad; and that the actions of matter-units of every level, their interactions, intra-actions on their own, or higher, or lower levels, are generically alike.

“As far back as 1772, Bode had pointed out a simple numerical relation connecting the distances of the various planets from the sun. This is obtained as follows: Write first the series of numbers

\[
\begin{align*}
0 & 1 & 2 & 4 & 8 & 16 & 32 & 64 & 128
\end{align*}
\]

\(^1\)Except molar objects.
Multiply each by three, thus obtaining

\[ 0 \ 3 \ 6 \ 12 \ 24 \ 48 \ 96 \ 192 \ 384 \]

and add four to each, thus giving

\[ 4 \ 7 \ 10 \ 16 \ 28 \ 52 \ 100 \ 196 \ 388 \]

These numbers are very approximately proportional to the actual distances of the planets from the sun, which are (taking the Earth’s distance to be 10):

<table>
<thead>
<tr>
<th>Planet</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>3.9</td>
</tr>
<tr>
<td>Venus</td>
<td>7.2</td>
</tr>
<tr>
<td>Earth</td>
<td>10</td>
</tr>
<tr>
<td>Mars</td>
<td>15.2</td>
</tr>
<tr>
<td>Asteroids</td>
<td>26.5</td>
</tr>
<tr>
<td>Jupiter</td>
<td>52</td>
</tr>
<tr>
<td>Saturn</td>
<td>95.4</td>
</tr>
<tr>
<td>Uranus</td>
<td>191.7</td>
</tr>
<tr>
<td>Neptune</td>
<td>300.7</td>
</tr>
</tbody>
</table>

So far no explanation of Bode’s law has been given, and it seems more than likely that it is a mere coincidence with no underlying rational explanation.\(^i\)

We disagree with Jeans’ expression that this regular relation is “mere coincidence.” If we examine the relative distances between the various planetary orbits we find some striking analogies with matter-units of other levels. Note that the differences between Bode’s numbers (4-7-10-16-28, etc.,) are 3-3-6-12-24-48, etc. The difference between successive planets is equal to the sum of all previous differences. Or, looked at differently, the distances double, after the first two. Or, after the first two, again, the differences are 1. 5 times 2 to the (1, 2, 3, 4, 5, 6, etc.) power.\(^ii\)

\(^i\) James Jeans, “The Universe Around Us,” p 19. 1929
\(^ii\) The outermost positions show up much closer than the pure sequence would suggest, leading us to suspect a narrowing of the increase of shell thickness as we approach the limits of a given matter-unit. We expect that an outer “surface tension” layer should surround each unit.
When we check the various orbital distances of the moons of various planets to their planet, we find a “Titus-Bode Law” which informs us that they also follow this doubling pattern. When we throw in a bit of electron theory we find again a suggestive square of the numbers relationship between the possible orbital positions of successive electrons, and that the squares of several of Bohr’s integers; i.e.:

\[
\begin{align*}
2^2 & \quad 3^2 & \quad 4^2 & \quad 5^2 & \quad 7^2 & \quad 10^2 \\
4 & \quad 9 & \quad 16 & \quad 25 & \quad 49 & \quad 100
\end{align*}
\]

are not far from

\[
\begin{align*}
4 & \quad 10 & \quad 15.2 & \quad 26 & \quad 52 & \quad 100
\end{align*}
\]

which are Bode’s numerical proportions of the planet distances from the sun, where Earth’s distance is represented by 10.

Furthermore, Bohr’s square of the whole numbers as representative of the orbital positions of electrons suggestively uses the same 1, 2, 3, 4, 5, etc., which are the successive powers of two required to be multiplied by 1.5 to yield the representative orbital positions of either planets or moons of stellar or planetary matter-unit systems.

In the atom, the first two shell-layers form an equilibrium pattern around any nucleus, and the next two sets of eight shells form equilibrium patterns, and the next two sets of eighteen shells form equilibrium patterns. In the sets of eight shells, each of the first five layers doubles the thickness from the nuclear surface, while the next three shells increase in thickness, but at a diminishing rate.

A formula which has intruded upon me says that if the first two shells combined are Q units thick, the next set of eight shells will be this thick, in order:

<table>
<thead>
<tr>
<th>Shell</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1.5 \times 2^0 \times Q$</td>
</tr>
<tr>
<td>2</td>
<td>$1.5 \times 2 \times Q$</td>
</tr>
<tr>
<td>3</td>
<td>$1.5 \times 2^2 \times Q$</td>
</tr>
<tr>
<td>4</td>
<td>$1.5 \times 2^3 \times Q$</td>
</tr>
<tr>
<td>5</td>
<td>$1.5 \times 2^4 \times Q$</td>
</tr>
<tr>
<td>6</td>
<td>the fifth plus $1.5 \times 2^3 \times Q$</td>
</tr>
<tr>
<td>7</td>
<td>the sixth plus $1.5 \times 2^2 \times Q$</td>
</tr>
<tr>
<td>8</td>
<td>the seventh plus $1.5 \times 2 \times Q$</td>
</tr>
</tbody>
</table>
Each such shell is composed of series of smaller subshells, all of which follow this progression. When any set of shells has fulfilled an equilibrium series then that entire set becomes a member of an overriding set of shell-sets which again follow the progression.

As, for example, in the following markings on the line.

![Diagram of shell thicknesses](image)

**Figure 19-1**

This sequence of shell thicknesses varies from place to place around the nucleus, but tends to remain in the same proportion. This doubling of shell thicknesses is seen in the atmosphero-stratospheric layers around the Earth, in the positions of a planet’s moons (Earth’s first shell limit, the “tropopause,” is 11.5 kilometers high, and Q has a value of 8).

Those numbered relations between the measured distances of the planets to each other and to the sun demonstrate that there is a doubling of the thicknesses of each layer between the first six planets, with a narrowing of that increase as we depart further from the sun and approach the outer planets. A closer look shows that the fifth planet (or its remains) is a bit too close to the sun, and that the seventh planet is the first to show a marked departure from the “proper” position. We then note that the eighth planetary distance is almost exactly double that of the seventh, from the sun itself. The prior pattern of doubling was of each successive layer to the thickness of its predecessor shell-layer.

The regularities of these relationships are of interest for two reasons. The first is that such a regularity indicates the strong probability of a direct physical cause for these positions. That cause may easily be that the ether does pervade the solar system (as well as everywhere else), that the ether is constrained into the layers of shells circum-the-sun that we proposed in our discussions as to the actions of sorce-venturi-spin nuclei on ether, and that the positions of the planets are foreordained by the layered energy-density levels around the solar-nucleus. The second is that we intend to immediately provide a series of measured facts which demonstrate that not only the solar system, but every planetary system, each
specific planet itself (as represented by Earth), as well as a specific atomic system, all exactly follow this regularity of pattern.

“The lower regions of the atmosphere up to the thermal zone is called the “troposphere,” signifying the region of continual change in conditions, such as temperature and barometric pressure; winds, clouds, and storms exist only in the troposphere. Above the troposphere there is calm and steady temperature; the temperature gradient runs parallel to the earth’s surface, and other physical characteristics are distributed in parallel layers or are stratified, this region extending indefinitely above the troposphere is known as the “stratosphere.” The boundary between the troposphere and the stratosphere is the “tropopause,” the region where storms cease, and calm begins.

“In the lower part of the stratosphere, or what may be considered as the true upper layers of the atmosphere, is a region extending to a height of about 50 kilometers in which the principle gaseous content is ozone, called the “ozonosphere.” The ozone is distributed in layers, as to density, the maximum density being at an altitude of about 23 kilometers. This stratum is often referred to as the D layer of the stratosphere. Its formation is probably brought about by the action of the ultraviolet radiation of the sun.

“Above the ozonosphere, the atmospheric pressure is too small to be measurable; however, this region is strongly ionized, there being several important and definitely determined layers of ionization. This outer region, above the height of 50 kilometers, is called the ‘ionosphere.’

“In 1902, A. E. Kennelly in America, and independently, Oliver Heaviside in England, suggested the presence of a conducting layer of free electricity, ionized particles, in the upper atmosphere which prevents electromagnetic waves from spreading into outer space. Such a layer would act like a reflecting surface and would confine the waves to a spherical shell (sic) between the surface of the earth and the conducting layer. In 1925, E. V. Appleton in England, and G. Breit and M. A. Tuve in America, by direct experiments definitely proved the existence of this Kennelly-Heaviside layer referred to as the E layer; and they also found two layers at higher altitudes known as the Appleton layers, F₁ and F₂. The heights of these layers vary greatly with the time of day, with the seasons, and with stratosphere meteorology. There are sudden and erratic changes in the heights, especially of the D and E layer. The sun-spot cycle apparently affects the ionization in all parts of the atmosphere. The Heaviside layer may vary in height from 50 kilometers in the daytime to 100 kilometers at night.
“The Appleton layers range from 160 to 250 kilometers above the earth’s surface. The heights shown in the diagram (Figure 19-2) are representative values to illustrate the general relations of the various layers.”

Let us list the heights of the various layers numerically:

11.5  23  50  100  200  400

Note that the doubling pattern is obvious. Note also that just as in the planetary sequences, the first two layers are of equal thickness. Note also that if we allow 11.5 to take the place of the 1.5 of the sequence on page 145, we repeat our power-of-two progression.

(We suggest that in addition to these overall power-of-two layers there is a series of intermediate’ layerettes all along the line, each layerette of the same thickness as its predecessor, wherein if layer 1 is, say, two units thick there will be successive layerettes two units thick, plus a doubled layer four units thick with equivalent layerettes four units thick, plus the layer eight units thick with layerettes successively recurring out into the surroundings each eight units thick,

---

1 Dayton C. Miller, “Sparks, Lightning, Cosmic Rays,” pp 159-16 1939
etc. We suggest the possibility that it is the successive zones of reinforcing where the successively larger layerettes coincide that produce the actual power-of-two layers themselves. We suggest that this sequence is the resultant of our curving, Venturi-sorce-density-wave-node, resonance-filled relationship at every microscopic or macroscopic level. We suggest that we may have allowed our own small size to lead us falsely to consider stars large.)

Figure 19-2 shows that the various layers double in thickness, up to a point, and, then there is a closing of the order of increased thickness, Further, the first two shells are of equal thickness.

The actual heights of these various Terran layers vary in response to the relative position of the sun, as well as to various energy changes of the sun which carry through the ether and affect that solar subordinate, Earth. This demonstrates how every matter-unit is itself a part of some larger unit, and is always under the influence of forces which are intrinsic to that larger unit, though extrinsic to the component members. It demonstrates that the general pattern of the matter units is one in which the energy and matter are in the greatest relational equilibrium with each other, and to which a matter-unit thus aspires; but that the extrinsic stimuli of external factors is always present to interfere with this sought-after form.

These Terran shells are composed of matter and energy in depth. They are not merely concentrically arranged spherical planes of puzzlement with nothing but a void in between. The solar system as well as any tiny atom has the same pattern of layers with or without orbiting particles. Since all matter-units are filled throughout with variable density material whose response to inergy forms these shell patterns, we may fairly conclude that all of the shells are similar to those of Earth and that the orbits of electrons moons, planets, etc. exist as the boundaries between the shell-layers of the parent matter-unit. Such boundary zones exist whether or not there also exists the electron, moon, or planet to follow those existing orbits.

Rather than thinking that the regularity of the distances between the planetary orbits are “mere coincidence,” and that the orbits are but the imaginary lines representing the paths of planets, et al we must recognize that the regularity stems from a regular, macroscopic, material density decrease with the distance from the unit-nucleus, with a “microscopic” variation of that overall rate of decrease superimposed upon it so as to form shells-in-depth. We must see that the boundaries between these material layers are density-energy boundaries among which subordinate particles will move if they possess the right amount of energy to remain within the matter-unit at all.

Changes in the density and temperature of Earth’s atmosphere are shown in Table 19-1 and Figure 19-3. The density varies, somewhat in proportion to the
square of the altitude, but close examination shows that the rate of decrease is not constant! There is a cyclical series of changes of the rate of density decrease. It falls sharply at first, then the rate slows until it seems that the density is about to stop decreasing, then the rate of change again falls sharply, then slows to a stop, and so on.

Examination of the temperature changes shows another interesting feature. As the rate of density decrease slows, the temperature increases. As the rate of density change increases, the temperature decreases. The combination of the temperature change plus the density change reveals the layered pattern of shells-in-depth plus boundaries concentrically layered. The first major shell is 11.5 kilometers thick and extends to the tropopause. It is remarkable that the doubling pattern of shell thickness extends as far, at least, as the moon. The average distance to the moon is within 1 percent of being $11.5 \times 2^{15}$.

Table 19-1. Density and Temperature of Earth’s Atmosphere Versus Altitude

<table>
<thead>
<tr>
<th>Altitude (km)</th>
<th>Density (g/m$^3$)</th>
<th>Rate of change of density (%/10 km)</th>
<th>Temperature (deg K)</th>
<th>Rate of Change of Temperature (%/10km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1120</td>
<td>- -</td>
<td>290</td>
<td>- -</td>
</tr>
<tr>
<td>10</td>
<td>425</td>
<td>65.2</td>
<td>230</td>
<td>-20.6</td>
</tr>
<tr>
<td>20</td>
<td>92</td>
<td>78.4</td>
<td>210</td>
<td>-8.7</td>
</tr>
<tr>
<td>30</td>
<td>19</td>
<td>79.4</td>
<td>235</td>
<td>11.9</td>
</tr>
<tr>
<td>40</td>
<td>4.3</td>
<td>77.4</td>
<td>260</td>
<td>10.6</td>
</tr>
<tr>
<td>50</td>
<td>1.3</td>
<td>69.8</td>
<td>270</td>
<td>3.8</td>
</tr>
<tr>
<td>60</td>
<td>0.38</td>
<td>70.8</td>
<td>260</td>
<td>-3.7</td>
</tr>
<tr>
<td>70</td>
<td>0.12</td>
<td>68.4</td>
<td>210</td>
<td>-19.2</td>
</tr>
<tr>
<td>80</td>
<td>2.5X10$^{-2}$</td>
<td>79.3</td>
<td>190</td>
<td>-9.5</td>
</tr>
<tr>
<td>90</td>
<td>4.0X10$^{-3}$</td>
<td>84.0</td>
<td>210</td>
<td>10.5</td>
</tr>
<tr>
<td>100</td>
<td>8.0X10$^{-4}$</td>
<td>80.0</td>
<td>240</td>
<td>14.3</td>
</tr>
<tr>
<td>110</td>
<td>2.0X10$^{-4}$</td>
<td>75.5</td>
<td>270</td>
<td>12.5</td>
</tr>
<tr>
<td>120</td>
<td>5.0X10$^{-4}$</td>
<td>75.0</td>
<td>330</td>
<td>22.2</td>
</tr>
<tr>
<td>130</td>
<td>2.0X10$^{-5}$</td>
<td>60.0</td>
<td>390</td>
<td>18.2</td>
</tr>
<tr>
<td>140</td>
<td>7.0X10$^{-6}$</td>
<td>65.0</td>
<td>450</td>
<td>11.5</td>
</tr>
<tr>
<td>150</td>
<td>3.0X10$^{-6}$</td>
<td>57.1</td>
<td>510</td>
<td>13.3</td>
</tr>
<tr>
<td>160</td>
<td>1.5X10$^{-6}$</td>
<td>50.0</td>
<td>570</td>
<td>11.8</td>
</tr>
</tbody>
</table>
(Pythagoreans may find a moment of joy in contemplating the following “mere coincidence.” The hydrogen atom possesses a nucleus (proton) plus one electron. The proton is about 1840 times the mass of the electron. The sun-to-first-planet distance is within 1 percent of being that number of kilometers produced by multiplying 1840 by the same $2^{15}$ used for finding the distance from Earth to the moon.)

As we ascend through the atmosphere the density decreases. As we pass through the stratosphere the density decreases. The decrease is not a uniform one. The pressure, temperature, and density combine to set up a series of shells, or thick contiguous layers, of alternating physical conditions as we leave Earth.\(^1\) The regularity of the positions of the moons from their planet, and of the planets from their sun shows that such an alternating field exists throughout the solar system. The whole of atomic quantum mechanics, wave mechanics applied to electron position around a atomic nucleus, spectroscopic analysis of atomic wavelength emissions, and the balance of the complicated modern mathematical physics at the atomic level combine to show us that the distances between the various electronic orbital positions in an atom also follow the regular pattern.

These complicated modern equational theories also have been trying to tell us that there are shells-in-depth as valence shells of atoms, that these shells exist with or without electrons, that these shells carry wave energies and possess increasing dinsky with the approach to the atomic nucleus, that the atomic nucleus is itself a shell-layered system of continuous material of variable’ energy-dinsky, and that the electron shells fall into groups. Further, it is strongly implied by the most modern findings that the nucleus of any atom is a very dense continuous material which acts as a perfect fluid filled with vortex filaments which possess identity, whose energy can be neither created nor destroyed, which persist forever unless thrown violently into one another, but which do not possess a permanent identity of material. It would seem as though some old ether-vortex theories about the nature of the atom were correct, but applied at the wrong level. The atom is a matter-unit with its own inergy and inther. The component parts of the atom nucleus are the ether-vortex wavicles with inergy, but exther.

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\(^1\) Editors Note: It is now known that the shell-systems penetrate the ‘surface’ of the Earth as well and can be directly observed as layers of water density in the depths of the oceans. The larger scale, more pronounced, boundary layers can also be seen in the geological seismographic studies of the earth’s mantle and core.
The material surrounding that nucleus falls off in density according to the square of the distance from the surface, on the overall view. It accomplishes this overall square-of-the-distance decrease by a series of variable rates of decrease, such that concentric zones are formed with boundary layers semidelineated between them.

The Bohr model of an atom had allowed that there are fixed distances at which electrons can orbit around a nucleus. These orbital distances were postulated as following the squares of the natural numbers proportionally to each other. This model was found to be close to the spectroscopic data of the hydrogen atom, but to break down at subsequent measurements.

The relation between these squares of the natural numbers follows closely the shell system progression described, but it breaks down as soon as the converging surface tension series of shells is reached. In any event, it is seen that the atom, the planetary shells, the moon-planet relations, and the planet-sun relations all follow a common pattern of shells of doubling thickness.

We see that the inther/inergy of all the shell systems follow the same general density patterns; the shells exist with or without component particles (electron-to-
nucleus, moon-to-planet, planet-to-sun); there is a material medium filling the entire solar system, as well as any other matter-unit; and the orbits of all orbiting bodies are in equilibrium only when they are on the self-existing boundary of a set of shells. (It is somewhat astonishing to learn that the orbits of the various dependent particles exist physically with or without the particles, but that astonishment derives from the preconception that particles orbit in a void space. It would be ridiculous to suppose that an independent orbit could exist in a void.)

It should be emphasized that since the basic density in any space varies according to the position of that space relative to the master matter-unit which controls it, the matter-energy relation between any particle and its environment will yield variable particle densities, variable wave energy rates of conduction, and other variable results as the overall densities of the master matter-unit’s shells change in the shell progression. The nature of both particles and energy actions thus depend upon the geometrical relations of the section of the larger matter-unit in which the matter and energy reside.

The Balmer ladder of the hydrogen spectrum shows that the second column, which represents the differences between the frequencies of the second and third, second and fourth, etc. spectral lines, gives us the power-of-2-times-1.5 series, as do the planetary distance differences.

Project: Get the frequency numbers of hydrogen spectrum, trace out the way Balmer reaches his progression, by dividing his huge number by the squares of the successive integers. Now substitute the distances between the planets into his procedures and work them backwards to find the huge number that would be the basic number for the solar system.

Since the solar system planets represent the second column of the Balmer series, it should be easy to determine what the first column should be. The numbers arrived at as the first column numbers should represent the orbital positions from the sun of two inner etheric planets not yet known.

“Etheric planets” means at least two inner solar shells (closer than Mercury’s orbit), and that these shells shall have limiting boundaries along which there should be an orbiting ether-matter configuration. That configuration would be a sort of traveling wave pattern into which any wandering material bodies (dust, gases, small meteorites, etc.) might fall and be collected.

In accord with the atomic theory that electrons do not exist in the shells closest to the nucleus, we would not expect these etheric planets to be the discrete particles which the known planets are. They might very well be transparent! (Light probably goes through them.) Although transparent, they should show a refraction effect on light passing through them, and if searched for in the right
places and depths, they might reveal themselves to the searcher as a change of position of the stars seen through them.

Very precise calculations are required here. First of all, these ethereal planets, or planetettes, would be quite small, and there would not be many places and times when a star or stars might be directly opposite them on our line of sight. Secondly, the refraction could be noticeable only within the zone-circle represented by the sphere of the planetette, and this zone-circle would be extremely small as seen from Earth. Thirdly, the displacement of the observed star might be only a fraction of the diameter of the planetette. The infinitesimal distances involved, as compared to the distance from Earth to the star, might defy instrumental detection. Space stations would help.

Finally, because of the proximity of the sun, these planetettes searches can be performed only during total eclipses of the sun. This, coupled with the first difficulty mentioned above, would make such a search well nigh impossible to perform successfully at the present state of the art.

It is easily seen, from the above difficulties, that the positions of these planetettes must be perfectly pinpointed before they can begin to be found. In order to calculate where they are, we must have recourse to the mythical planet, Vulcan. Vulcan was hypothesized in order to explain the eccentricities of Mercury’s orbital path. Vulcan’s position was calculated and searches for it made, but the searches were fruitless. But now we are to look for two, rather than one, planetette. The two of them combined must have the same gravitational effects as were postulated for Vulcan. The orbital distances of the two planetettes are 15 million kilometers and 22.5 million kilometers from the sun respectively. The positions in their orbits which these two ethereal bodies (?) have at any given moment can probably be calculated by observing the path of Mercury, while ignoring the curved space time of relativity. The small error left by relativity calculations may represent the effects of even less discrete planetettes closer in to the sun.

A close study of Kepler’s Laws concerning planetary motions might provide several aids toward predicting where these ethereal configurations may be found, and how large they should each be. That study would have to be coordinated with an understanding of the relative dinsities of the various planetary shells of the sun.

By applying atomic physics to the anatomy of the Solar System, these interesting results were obtainable. The sun system is actually a large atom itself. It corresponds to neon, on the Periodic Table. Analogously, the Milky Way Galaxy, like all galaxies, is a multi-nucleated matter-unit. Is it, perhaps, a deoxyribonucleic acid molecule?
Chapter 20

Sequelae to M & M

It is time to resume our investigations into some of the sequelae to the Michelson-Morley experiment. What about the failure of the tests for an “ether drag” by the spinning discs? What is the meaning of that?

Well, what were the premises of the spinning disc experiments and how were the experiments performed? After the M & M experiment “failed,” it was thought that perhaps the earth dragged the ether along with it. “If the ether moved along with the earth, filling all the spaces between the solid atoms, that would account for the speed of light remaining unchanged in the M & M experiment,” it was suggested. To test this suggestion, two discs were set spinning alongside each other and a light was sent between them. If the ether is dragged along by moving bodies, went the reasoning, then it will be dragged around by the spinning discs and the light should move at a variable rate between two fixed points as it traverses this moving ether. The results were negative. Why?

Off we go to get a long running start again. We enlarge our frame of perspective so as to include the whole solar system into our view. The solar system is a matter-unit. It has a nucleus (the sun) and many shells. Along the boundaries of those shells the planets move, like so many electrons in an atom. The solar shells are filled with matter. Although that matter is arranged into local organized forms, those subordinate units are part of a contiguous continuum of matter. They make up a continuous ether, just as they are themselves made of the continuous ether. Ignoring the sun’s spin, let us temporarily concede that the ether (continuous matter) of those shells is at rest to the sun. It decreases in density as
we depart from the sun, but the decrease is at a staggered rate. The shell pattern is at rest to the sun.

Focusing down a bit, we find the little “electron” Earth moving along the boundary of one of these shells. It is no startling news to anyone that the tenuous gaseous hydrogen atoms of “space” do not float gently through the Earth. Nor even through the atmosphere. Why, then, should it surprise anyone to learn that the continuous ether of Sol’s shells, the continuous ether which is the tenuously spread outer bodies of these hydrogen atoms, does not exist at Earth-level conditions? Why should it be regarded as remarkable that whenever we provide the conditions in which such gaseous atoms do exist (as in a “vacuum chamber”) those atoms must remain within their protecting chamber? They can’t just float through solid walls!

With these rather obvious facts to go on, it should be equally obvious that the Earth-unit moves through the Solar-oriented ether not by dragging it along, not by allowing it to flow sweetly through the solid ground, not even by letting it float through our gaseous atmosphere. Earth moves through the etheric shells of Sol by displacing that tenuous, highly compressible and expandable material. The nature of that displacement takes the form of the previously described shells around the earth. There is a zone wherein the etheric material is at rest relative to the solar-unit. Closer to Earth there probably is a transition zone in which the ether begins to move, in a gradient with the approach toward Earth. Relatively, closer to Earth there is a zone within which all of the material of all of the states and organized forms of matter which enter into the structure of our planet move as one unit. Their environmental material belongs to and moves as the planet Earth.

Earth is a matter-unit. Everything which is a part of it is either absolutely in motion or absolutely at rest, where Earth is the privileged frame of reference. But Earth itself is a part of a larger matter-unit. A small part. The material of the solar system cannot sensibly be considered to be at rest relative to Earth, wherefore it follows that Earth is in absolute motion through its environmental material. That material is under the control of the solar system, with the sun as its privileged frame of reference. Because the “zone of calm” starts at the height of the tropopause, and because there is an outer limit to the identity of the matter-unit Earth, let us appoint that tropopause as the boundary of the matter-unit Earth. Outside of that limit we concede that the ether is not moving with Earth, but is instead displaced. We further decide that since empirical evidence demonstrates that there exist definite pressure-density-temperature shells around Earth, throughout the solar system, and around any atomic nucleus, the nature of the ether displacement occurs in discrete shell-like layers.
Since the width of the tropopause layer is small as compared to the size of Earth (let alone the solar system), and since the troposphere is the extent to which Earth “drags the ether with it,” we find that any ether drag at all would be limited to a very small distance from the surface of the absolutely moving body. Beyond that distance, however, there must still exist physical consequences of the motion of the body. There are displacement effects in the surrounding medium. Those effects are shell-like variations of density and pressure; and those effects show an overall decrease in intensity with the doubling of the thickness of the shells (decreased intensity of effects with the square of the distance from the source).

In regard to the spinning disc experiments then, we should expect to find a variation in the speed of the light passing between the discs, where that variation occurs only extremely close to the surfaces of the discs. Further out we should expect to find a series of diffraction effects, as the light passes through the zones of alternating density rates of change. Indeed, if we find any evidence whatever of refraction or diffraction around the immediate neighborhood of the spinning discs, we must conclude that the path of the light has changed, and that such a change of direction is the light’s only alternative to changing its speed relative to its conducting medium.

Why should we expect such effects? First of all, the fact that a disc begins to spin means that its surface is in motion. That motion sets up our venturi pressure effects, wherein the surrounding medium will exert less pressure upon a point A in Figure 20-1 than when the disc had been at rest. Since it is the natural procedure that pressure everywhere tends to equalize, such a decrease in pressure at a point will be followed by a flow of surrounding material toward that point. The flow will stop as soon as enough material has entered the area to equalize the pressure.
In such an event, it should follow that if there is to be any distant effect upon light speed as a result of motion of the medium, that effect will occur only during acceleration or deceleration of the disc. At any constant rotation of the disc, equilibrium conditions will rapidly ensue. The nature of that equilibrium, however, must be one in which there are zones of varied medium density. Such zones must cause bending of the path of the light. Such a bend arises because the light would have to enter more material per unit time as it entered a denser medium, if its speed were to remain constant between two fixed points. But the speed of light is a constant with respect to the amount of material it will traverse per interval, so it slows down per abstract distance through a variable density medium. If the density varied uniformly along the path of the light, there would be a slow down with no curvature. If the density varies irregularly across the path of the light, there would be irregular curvatures. If the density varies in the shell-like pattern of the matter-units, there should be a series of proportionately spaced dark and light bands at the end of the light’s path.

Instead of setting up the spinning disc experiment for yourself, try this one.

1. Find a near sighted person. 2. Remove his glasses. 3. Give him any solid object, a pencil for instance, or even his finger. 4. Give him a printed page and have him set it at a distance just sufficient for the print to be illegible to him. Now have him pass the pencil or other object perpendicular to his line of sight, about one-half inch in front of his eye, until it just fails to block the print at which he is looking.

The result will be that he will find the print legible because there will be a refraction or bending of the light as it passes the pencil.

This effect may be noticed with any material object used in place of the pencil, and it demonstrates that there actually is a density zone in the medium surrounding any object whatever.

This being so, it follows that there must be such zones around the discs whether spinning or not. In which case it follows that there necessarily must be “ether” displacement effects around the spinning discs in the experiment. And if this be so, then it cannot be true that the spinning discs have no effect upon the light-conducting medium. What is more likely is that the experimenters just didn’t know what to look for, since their minds were beclouded, with vast vistas of space between the tiny atoms of a “solid.”

Remember that the zone of “ether drag” around the discs would be proportionally as thick as the tropopause layer to Earth, that the density shell displacement effects would decrease in intensity with the square of the distance from the surfaces, and you will understand that the changes would be least noticeable at the center of the distance between the discs. Indeed, if the discs were spinning closely enough to each other for the displacement shells to overlap, it is
hard to tell just what would be happening at the midpoint between them. They might just cancel each other out.

In any event, the solid discs can no more drag the ether around within themselves than can the solid Earth. A solid doesn’t drag a liquid around within itself when it moves through a liquid. How could it when the liquid doesn’t exist within the solid? Why should anyone expect that a solid should drag the ether around within itself when the free ether exists only outside of solids, liquids, and gases?

On the other hand, since all matter-units are basically made of continuous matter (ether), whenever one state of matter moves through another, there must always be displacement and even limited dragging effects. Furthermore, it is highly likely that if the moving object moves too fast, it will set up boundary layer adhesions whereby a very thin “skin” of environmental material will travel as part of the object, smoothing out its surface and decreasing the interferences against the surrounding medium, so as to decrease rather than increase the drag. Perhaps the doggone discs were too smooth and spinning too fast?

Summary

1. We do not believe that the spinning discs showed no effect upon the light-conducting medium. We insist that the very presence of the disc, or any other material object (the pencil of the experiment on page 158 for instance), automatically sets up interference effects in the surrounding medium. We suggest a closer re-examination of the spinning disc experiment itself.

2. We further expect that the form of these effects will consist of a (proportionately) very fine zone of surface adhesion, with a system of shells of density variation, where the density will decrease with the distance from the surface, but at a cyclic rate.

3. We further take from this situation the expectation that every matter-unit tends to produce similar effects in every surrounding medium, and thus tends to act as the nucleus of a larger unit.

4. Such overlapping effects suggest the beginnings of explanations of gravitational attractions, but are more directly of interest to us in that they suggest widespread, overlapping, permanent force patterns around, within, and permeating each and every matter-unit in existence.
Our discussions have begun to depart from a concentration on “matter” into greater emphasis on the actions of that basic item. Those actions represent various relations between different units and different portions of material. Unless we agree on the way in which we shall handle “relation,” the words used will confuse rather than elucidate. Before continuing with the actions of matter and energy, then, we shall have to devote a part of this book to the study of relation.
PART III

Relation
Chapter 21

Introduction

Nature is one endless cosmos. The “one” has many parts. It has four irreducible components, each of which cannot be created out of any of the others. Such an irreducible component is a “basic item” of nature. In this book we are concerned with the first three basic items, which are

1. Matter
2. Energy (motion and pressure)
3. Relation

The fourth basic item, consciousness, is outside the scope of this understanding. Its complicating role upon physics shall be the arena within which future adventurers after truth may find their windmills.

In this third part we shall examine the handling and treatment of relation. In modern science, relation and mathematics are synonyms. In the deepest penetrations of modern physics, mathematics is the last item left at all. This is most curious. It is matter and energy that have relations to one another. When matter was denied existence, and energy became a mystery, science ignored the nature of the relata in favor of the relations between them. It now finds itself knowing more and more about it knows not what.

Relation is not all that exists. Nor is it just a product of matter and energy. It is a reality of nature, and a basic item in its own right. It provides the formal aspect of nature which is so important to the actions and reactions of all else. Before the
detailed understanding of the mechanisms of the various forms of energy can resume, then, relation should be understood.
Chapter 22

Relation and Dimensions

All things are situated.
The sophisticated reader will find the period the most unusual part of that sentence. He will note that we have omitted Newton’s space and ordered time from our statement. It was deliberate.

Things are not situated “in space” because there is no such thing as a void space for things to be situated in. Nor is time a place, or a physical entity into which things may be ordered. Time and space are the rational dimensions with which man measures certain relations between things, but are not receptacles independent of the things they receive.

There is a real and physical objective relation between all things. That relation is measurable in the dimensions of space and time. The actual relation is absolutely whatever it may be, but the dimensions are relative to the rational fiat of the observer.

General Discussion

There are numerous separate things in nature. All of them are situated with respect to each other. There is a “relation” between them. Although matter and energy are prerequisites to relation in that there must be things-which-relate (relata), the relation itself is not matter nor energy. Nor is it made out of those
basics. It exists simultaneously with them, wherefore, since they have ever existed, so has relation.

The spatio-temporal relation between things plays a direct part in actions and reactions, hence is an integral basic item of nature. It is non-material, hence must be considered a “formal” item. In addition to the “material cause” in nature, we thus find a “formal cause.” The formal cause, we iterate, is predicated on the material. Without matter, there is no existing form.

The history of philosophy and physics is filled with discussions concerning the nature of space and time. One of the earliest mistakes of theorists was to have hypothesized an existent void throughout nature, into which matter could be placed. There is no such thing. Since there is no void, it is pointless to discuss its mathematical properties. Moreover, since there is no void space, and since matter is everywhere, and since ubiquitous matter is everywhere in a state of flux, there is no one special point or matrix in nature which must be taken as the fixed, unmoving center of relational systems.

There is a duality to relation. First, there is the real and physical “objective” relation between real and physical things. It is a spatial relation that varies with the passage of time. It is a temporal as well as a spatial relation. The temporospatial relation is absolute in the sense that it is whatever it is, independently and regardless of whether or not it be measured, weighed, timed, numbered, temperatured, or otherwise dimensionally treated by us. Thus, for instance, there is a certain space-time relation between all objects in the universe at any given instant. It is what it is. Absolutely.

Secondly, there is the “rational” system of mathematical relation with which we measure that “objective relation.” There is the “rational relation” of measuring systems. Such systems use dimensions, which are logical abstractions from reality, specified with units of value that are appointed by arbitrary convention.

The first dimension, “quantity” is the dimension in which the dimensions are measured. The dimension of extension is distance, which is arbitrarily divided into three perpendicular directions, length, width, and height, which between them encompass all the infinite possible directions of distance. The dimension of duration is time. There are several other dimensions, but since the things they measure are not clearly understood (heat, density, mass, odor, emotion, flavor, etc.) we shall sweep by them with but a slightly surreptitious glance.

Let us make a rough chart (Table 22-1) of the various dimensions, units, etc. A quick look shows us that all the units of measurement are of arbitrary value. The same quick look shows us that all of the “objective relations” are variable, wherefore it is the role of “rational dimensions” to provide constant-valued dimension units against which that very variability may be measured. The
Question as to whether the measuring units are constant, or variable in nature (1) is thus not only meaningless, but far worse, it is misleading. Like the question, “What is matter made of?” that question rests upon a false preconception.

Question: What is matter made of?
False preconception: Matter is made of something other than matter.
Truth: Matter is a basic item.

Question: Are dimensional units variable in nature?
False preconception: Dimensions exist in nature.
Truth: Dimensional units are rational inventions. Their values are agreed upon arbitrarily.

Table 22-1. List of Various Dimensions, Units, Etc.

<table>
<thead>
<tr>
<th>Objective relation</th>
<th>Rational dimension</th>
<th>Unit specified for measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>Number</td>
<td>1, 2, 3, etc. or symbols with potential number value</td>
</tr>
<tr>
<td>Extension</td>
<td>Distance</td>
<td>Metric or similar systems (meter, yard, inch, etc.)</td>
</tr>
<tr>
<td>Duration</td>
<td>Time</td>
<td>Segments of period of rotation of Earth (second, minute, hour, day, etc.)</td>
</tr>
<tr>
<td>Heat</td>
<td>Temperature</td>
<td>Degree</td>
</tr>
<tr>
<td>Density (dinsity)</td>
<td>Sometimes mass, sometimes not known</td>
<td>Densum</td>
</tr>
<tr>
<td>Mass</td>
<td>Weight</td>
<td>Avoirdupois or metric weights</td>
</tr>
<tr>
<td>Odor (flavor)</td>
<td>Yes</td>
<td>Sweet, bitter, salty, acid</td>
</tr>
<tr>
<td>Emotion</td>
<td>Never</td>
<td>Love, joy, anger, sorrow</td>
</tr>
<tr>
<td>Intelligence</td>
<td>The most</td>
<td>I.Q.</td>
</tr>
</tbody>
</table>
Rational geometry is a language. It speaks in terms of dimensions. These arbitrary inventions are divided into equally arbitrary units. For convenience, so as to ensure insofar as possible that our mutually agreed upon dimensional units possess a constant and commonly understood value, we generally consent to establish a physical object, maintained under as close to changeless physical conditions as possible, as our standard of reference. Hence, we establish a certain metal bar, under certain stated physical conditions, maintained in a specific place somewhere or other on Earth, as our model of a unit of length of 1 meter. Or 1 yard, or a foot, or inch, or millimeter. Should circumstances beyond our control occur (a fire in the building, perhaps) and should our arbitrarily appointed example of our arbitrarily agreed upon unit of length alter in its actual physical size, would we rush madly around changing all of our maps and signs and calculations? Would we accept the fact that a meter had just become half again as long, just before it dripped into a small circular puddle? If our clock slows down, has time? If our meter rod shrinks, has extension, itself, shrunk? Meaningless words.

Our reference bodies are a crutch for the weakness of our intellects. Since we cannot mutually remember and hold in mind the values of our arbitrarily agreed upon rationally invented units of dimension, we set up objective items to represent, for us, these purely imaginary quantities. Our rational units are either constant or variable according to how we agree to set them. They have nothing whatever to do with any unplanned alterations of their objective representatives: the physical crutches.

Most of us will agree that the simplest and most easily understood method of handling the units of measuring time and length is to hold them as absolute, i.e., constant and changeless in arbitrary value.

On all macroscopic levels quantity is an absolute dimension. For molecules and generally for atoms, quantity is absolute. For sub-atomic particles, however, identity begins to intermix. Portions of material enter into and out of the system designated as “particle.” When identity begins to be lost, quantity becomes relative. As we shall see, here is the real indeterminacy in nature. It is an indeterminacy based on a lack of determinable, lack of existing, one-to-one identity of differentiated very small zones of material and energy.

Time is measured in fractions of the average period of motion of the planet Earth. We know that that period is variable, from time to time, but we also know the extent of that variation, hence correct it to get our constant unit of time. Various events, such as time of transit of light of specified and exactly measurable wavelength are often used as reference standards by more modern chroniclers of units of time. The unit, however, is abstract and invented, no matter what we seek out as physical standards of reference.
Length is measured in units of the various systems so far invented. In order to allow measurements of length to be performed, it is necessary to arbitrarily select the positions between which the length is to be measured. We need “points, lines, planes, and coordinate systems.” All are part of the rational, arbitrary, invented, subjective side of relation.

The fact that the numerical or symbolic systems of measuring quantity can produce a lack of exact correspondence with microscopic nature reveals that even numbers ultimately belong to the rational side of relation. At last, we may finally recognize that the rational mind herein demonstrates its ability to continue to understand certain objectively real items of nature (such as the lack of identity of fluid portions of etheric material, the possibility of time pieces slowing without in any way affecting duration, the possibility of source changes affecting the sizes of standard meters or wavelengths of lasers without altering the constancy of one meter of abstract length, the possibility of the hare overtaking the tortoise in a finite time) even though the methods of mathematics find their boundary limits thereby surpassed. We thus see that the quantitative approach to nature must eventually give way to the qualitative, if we desire ultimately to reach a complete understanding of the phenomena of nature.

We therefore decide that the manner in which we shall handle our quantitative invention, mathematics and geometry, must be dictated by purely qualitative considerations. This is the consequence of the recognition that our ability to understand nature overwhelms the boundaries of expression of that limited quantitative language.

We may even expect that qualitative discoveries should lead to the invention of new “words” in mathematics, thus of new methods of handling quantitative considerations. Since we have seen that there is no ultimate numerical correspondence between quantity and nature, we thus recognize that there may be no ultimate quantitative determinism in mathematical physics, even though there be both qualitative determinism and correspondence, to the final degree, between nature and our understanding of it.
Chapter 23

Coordinate Systems

Two perpendicular lines define a two-dimensional coordinate system. Their point of intersection is the zero point of that system, and the system itself can be used to specify any point on the plane surface that conforms to the plane of the two lines. Hence, if line x and line y (the two lines) be divided into numbered series, point x - 3, y - 4 is found by moving to point - 3 on the x line (x axis), then parallel to the y axis to the level of y - 4.

Three intersecting perpendicular straight lines define a three-dimensional Cartesian coordinate system, i.e., a Euclidean-Galilean system. So as to make such a system’s zero-point the same for all persons we are in the habit of arbitrarily attaching that imaginary point to any arbitrarily chosen physical object, as our frame of reference. We thus elect any physical object at all upon which to center our invented coordinate system of reference. With reference to that system, then, we expect to be able to specify any point in the cosmos in terms of the x, y, and z coordinate numbers. We got so used to this habit of thought, in classical days, that we forgot how non-existent and imaginary the whole procedure is. We forgot that our dimensions (lines, points, axes, planes, and numbers) don’t physically exist. We even began to argue whether or not nature was “made” this way or not.

To specify an outside body with reference to any commonly agreed upon zero-point Cartesian system that is in motion with respect to that outside body, it is necessary to state the time at which that outer body is at the specified xyz point. We state the xyz (perpendicular spatial coordinates) and t (time coordinate).
Although it is physically impossible to draw four mutually perpendicular lines through a given point, it is rationally possible to state that we are considering a coordinate system made up of four (or more) such lines, where the fourth (or more) represent dimensions other than spatial, i.e., time.

If we call our three (or 30 or 360 or any other arbitrarily appointed number) spatial coordinates $x_1$, $x_2$, and $x_3$, then our time coordinate becomes $x_4$. By stating the coordinates, say, $x_{1-4}$, $x_{2-5}$, $x_{3-6}$, $x_{4-3}$, we can specify the position in “space-time” of any outer “point” of that “four-dimensional space-time continuum.” That specification, of course, is with respect to the zero point of the system, which is attached to any chosen object of reference. (We might try to imagine that system as being centered in “space,” but there would then be no way for more than one person, i.e., the inventor of that particular zero point, to know where it was imaginarily centered. Indeed, there wouldn’t even be any way for the inventor of it so to know.)

Instead of electing to make our coordinate system Cartesian, i.e., composed of intersecting perpendicular lines with a common zero point, we might just as arbitrarily elect to make our lines curved ones. We might then draw a series of semi-parallel curved lines on a surface, then cross them with another series of mutually, semi-parallel curved lines so as to have two sets of intersecting curved lines. If we now number each of these lines, starting with line 1 anywhere at all, we could now specify any point on the plane in terms of the specific lines that cross each other at that spot.

The only difference between this Gaussian system and the Cartesian system is the curvature. We can easily expand this two-dimensional system of curved intersecting sets of lines to a three, four, five, etc. dimensional system. The four-dimensional system, in terms of space and time, then becomes a “four-dimensional curved (Gaussian) space-time continuum.”

We now ask, “Does the metric of space conform to the Euclidean-Cartesian three-dimensional system, with time as an independent agency, or does the structure of nature conform to the Gaussian, Einsteinian-relativity system?” Oh, what a bundle of misconceptions, errors, loss of memories, and null-logic underlies that fantastic question! We have equated the “metric of space” with the structure of nature” with coordinate systems, as though all equally may be said to “conform” to a common physical reality.

To recognize the serious paradoxes contained in such a question look again at the questions on page 166. Remember again that there is no such thing in known nature as empty space, hence that space is just another word for volume. Remember that nature, therefore is not “made of space,” that space, being somewhat abstract, has no intrinsic structure. Add the recognition that both Gaussian and Cartesian systems are not only interconvertible, are not only arbitrary inventions of rational thinking, but are both physically non-existent - - -
and you will realize that the controversy between the Galileian-Newtonian basis of classical physics and the Gaussian-relativity basis of modern physics (and even the added confusions introduced by quantum physics) are irrelevant tempests in an immaterial teapot. All are inventions of arbitrary, unreal, relative, imaginary mathematical systems, having no dependence whatever upon the actual structure of nature. Nor vice versa.

II

There is, however, an advantage to be gained by using a Gaussian (curved lines) coordinate system. An advantage which could not be realized just from considerations with respect to a Cartesian system. To emphasize their mutual lack of intrinsic superiority to one another, however, we shall allow a Cartesian system to evolve into a Gaussian system as we demonstrate that advantage.

Consider, if you will, a three-dimensional Cartesian system of mutually perpendicular straight lines. Now imagine that an infinite number of parallel lines be drawn to all of these lines so that, for instance, at x - 4 a line parallel to the y axis intersects the x axis, and a line parallel to the z axis also intersects the x axis at point 4. (Indeed, whenever we locate an xyz point, that is the imaginary way we do it, i.e., by imagining perpendicular lines.)

Now, consider that these lines are represented by strings, strung in space while occupying no thickness themselves. Next, consider that we enclose the entire coordinate system in a flexible, transparent jelly. Now distort the jelly! See the Gaussian system suddenly wiggling before you? The “strings,” x - 4 string, y - 3 string, z - 6 define a specific point of the actual material of that jelly. However the jelly distorts, as it flies erratically through undimensional space, the point defined by our Cartesian, neo-Gaussian coordinate system remains x - 4, y - 3, z - 6.

The advantage gained by allowing the rigid Euclidean metric to soften into the non-rigid Gaussian metric is just this: Had we maintained the abstract Cartesian regularity of metric while allowing our object of reference (the jelly) to distort itself playfully in space, then our coordinate system points could not correspond to physical points of the jelly. The Gaussian system seems to be intrinsic to the jelly. The Cartesian system does not; instead it seems to remain more obviously abstract.

What we really gain from this is the recognition that it is possible to define the structure of a material field in terms of Reimann-Gauss coordinate systems whose structure varies according to the physical alterations of that material field. It is also possible to set up a Euclidean-Cartesian coordinate system in terms of which alterations of physical materials are plotted by comparison against coordinates.
which remain in constant position, i.e., by plotting the flow rates of the material in terms of successive coordinates traversed. We are free to invent and choose either system. Or, indeed, we may and shall elect to use them both simultaneously.
Our course is clear. Once we clearly recognize and define the objective-subjective duality of relation we can accommodate it. It is even rather simple.

We recognize that subjective relation is rational mathematics. We elect to make our invented dimensional units constant and changeless. We so choose because the Euclidean geometries of changeless units are those most intimately related to our ability to understand.

We recognize that objective relation is independent of us. We recognize that objective relation is a real and physically existing relation between specifiable actions of real material objects. We also recognize, from previous discussions, that the objective reality is made of fluid, variable density, variable density material. We recognize that reality is made of universally present motion and pressure, with universally variable but mutually interdependent matter-units. We therefore recognize that the objective relation, while absolute (in the sense that it-is-whatever-it-is), allows variability of quantity, length, rate, and mass of all things that enter into such relation with one another.

We shall set up a universal three-dimensional Cartesian-Euclidian coordinate system and plot local Gaussian four-dimensional systems at appropriate places we choose within it. Where the center of the universal Master Coordinate System shall be, and where the local Cad Coordinate Systems shall be located must be discovered by our understanding of the structure of nature.
Our suggestion is that the center of the Macs (Master Coordinate System) be arbitrarily placed at the nearest point to Earth which is sufficiently remote from all island universes as to be as close to a uniform material field as possible, a point on the minimum density matrix of the cosmos (see diagram on page 140). That central point can be established at an arbitrarily agreed upon moment of time, say, 12:01 AM of the year 2000. That point of the fluid cosmos, and that moment of time, shall ever before and after be the zero point of the three perpendicular straight lines which intersect there and then extend infinitely in all directions, and of the even passage of the temporal dimension in terms of which we become capable of forever and at will locating our Master system, through reference to those largest matter-units with respect to whom we initially established that point, and whose motion we can plot so as to extrapolate back to the zero point.

We suggest that the hydrodynamics of the material ether can be plotted upon this Macs. Were the flow of the ether random, science and we ourselves would be impossible. The existence of the hierarchy of matter-units demonstrates a regularity, a predictability, an apparently perfect quantitative relationship between the etheric flow patterns and knowable core effects resulting from measurable or deducible energy patterns. The knowable existence of such patterns, which find their expression in the matter-unit systems, makes it possible for us to set up Gaussian coordinate systems for each such unit. In such systems the curvature of the $u, v, w,$ and $t$ lines will correspond to the variable density of the etheric material at the given cad of that specific and designated matter-unit, where the curvature of the time coordinate will represent a Macs-variable light speed which is constant in abram (densa). ¹

It is to be explicitly recognized from this that each and every matter-unit becomes a privileged frame of space, a special center of the curved “space-time” geometry which is centered upon, and at rest to, that particular unit. Not only is the geometry of that unit special to it, but the patterns of inner and inergy also act with special reference to that unit which owns and is them. The objectively real components of the specific unit as well as our abstract local geometrical representation of those components thus correspond. (We suggest that the cad under consideration always be chose as just sufficiently large as to allow its background etheric matrix to be taken as at rest.)

We suggest, then, that the cad coordinate system be a Gaussian system which has as its privileged center the matter-unit in control of that chosen zone. We suggest that the curvature of that “gax” (Gauss Coordinate System) will agree with the theory of relativity’s final tensor mathematical forms, with the quantum-theory-coordinating proviso that the variations are not the smooth curvatures of

¹ The last half of this sentence represents the entire general theory of relativity.
square-of-the-distance variability of field effects, but instead follow the jerkily discontinuous rates of change of the material and inergy layers of all the many matter-units. (We expect that when the curvatures of the Gauss systems are corrected for this ubiquitous irregularity, which irregularity is itself of a perfectly regular and predictable quantity, the field physics and the discontinuous quantum physics will begin to merge.)

When we now consider a gax from outside itself, we will realize that the entire gax is in motion in the cosmos, hence as plotted upon our macs. We can now understand an imaginary picture in which a model macs could be constructed and programmed into computers, and model gacs of all moon-sized and larger matter-units can then be constructed and programmed into their appropriate places, with their appropriate motions, and their gaussian, molluscian, flying jelly-roll matrices all programmed into the model macs and its computers. We might then produce a gax for a certain one (or more) space ship, and plot its course of least dinsity, greatest max speed on the max model. Some day, no doubt, such a giant planetarium will be in daily use as an interstellar flight control center.

Consider the unit Earth. It rotates on its axis. It revolves around the sun. It moves through space with the solar system, and maintains its approximate position in the self-rotating galaxy. It is also at rest, as privileged center of the gax which use it as parent matter-unit. The gax, however, are non-Euclidean. We elected to make them Gaussian, because the degree of Gaussian four-dimensional curvatures could be made to correspond to the actual variations of lengths, times, and wave energy Euclidean rates of motion that obtain under the actual physical sorce-densa abram relations at given cads. While we thus show good reasons for making our gax Gaussian, we have an equal right to represent them with Euclidean-Cartesian systems. We may, should we care, set up Cartesian systems centered upon the given matter-unit considered, in this case, Earth. Our local system (lax), then, would be centered as at rest to Earth, hence in motion on the max. The motion of the lax, hence of Earth, would then be expressible in the ds2 so dear to mathematicians.

With regard to the question of non-determinate identity we must admit that from far away every matter-unit has an absolute identity. Even from right next door the interior of the unit can be exactly specified and identified. It is only the boundary limit itself that can not be precisely specified, and that only because the material component of the unit fluxes into a standing-traveling wave configuration.¹

In terms of the gax the boundary is non-determinate. The cad-attached, Gaussian jelly-roll geometrical coordinate system is attached to a portion of

¹To be discussed in Part 4, Energy.
material at every place. When the limit of the unit is reached, but the unit does not
abruptly and politely end, the Gauss coordinate system starts flapping loosely in
the breeze. When the unit is seen to spin, the loose ends of the gax don’t know
whether to spin with the unit or to hang back with the local material they are
supposed to represent. Here is where the gax is indeterminate.

Here is where a Euclidean lax and max take over. A lax is a cad-centered
Cartesian coordinate system, a local max. That system moves with the unit, but
does not otherwise distort. In terms of the endless lax the boundary of the unit-
Earth, with its force-matrix standing-traveling waves, is fully specifiable. The
motions of the material components at any given zone may be specified as
follows: 1. Material at rest to the planet, and part of its unit-identity, are at rest to
the lax. 2. The standing-traveling matrix is at rest to the lax. 3. The transition zone
of ether material, which rapidly comes under the influence of the layered pattern
of Sol as we ascend from Earth, may now be plotted as to degree of motion at
each point of the lax.

Every given spot of the ether can now be found by analysis of the flow patterns
plotted upon the lax. This, of course, is equally true although more complicated,
in terms of the master-Cartesian system, i.e., the macs (max).

We shall now consider certain interesting thoughts which come out of the
comparisons of the gax and the lax. Consider the action of light. In the variable-
mollusc Gaussian gax each point of the system remains attached to that point of
material corresponding to the intersection of the specific curved lines that define
the point. Thus, when the unit compresses, at some zone, all points get closer. The
distance between two points thus remains always “constant” in gax terms. When a
gax is made to vary in accord with the “curvature of space-time in response to the
position of material present within it” the distance between two gax-points always
represents a constant number of densa of the material present. In nature, the
variations of the pattern of the gax correspond to variations of physical size,
number of shell-layer variations, etc. of the material of that gax. The travels of
light, as to path and rate, then may be said to be constant (absolute) with respect
to that gax, although curved and varied as to a max or lax.
In Figure 24-1 we see a uv two-dimensional gax. There is an interval between $u_1, v_3$ and $u_5, v_4$. It is represented by the arrowed line. In Figure 24-2 the entire gax has condensed. We might say that “the curvature has increased.” The line interval has remained exactly the same in terms of the gax! If this line now represents the time-distance path of light it might be said that the speed of light was absolute (unchanged) in both figures.

If we substitute $x_1$ and $x_2$ for $u$ and $v$, and add $x_3$ and $x_4$ to make up four-dimensional gax in Figures 24-1 and 24-2, then consider the light travels represented by the arrowed lines of the figures we may readily understand what Einstein means when, with regard to quantitative statements about natural agents, he says,

“According to the general theory of relativity . . . by application of arbitrary substitutions of the Gauss variables $x_1, x_2, x_3, x_4$, the equations must pass over into equations of the same form; for every transformation corresponds to the transition of one Gauss co-ordinate system into another.”

In short, all dinsities and rates of action must vary in precise proportion to the different background force matrix strengths of gaxes at different cosmic zones.

We go along with this objective interpretation of nature, with these major stipulations.

1. There are as many special Gauss systems as there are matter-units.

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2. Each such unit is the privileged center of its own special such gax.
3. The “curvature” of the gax follows the shell-layered rate of change demonstrated in Part 2, Chapter 20. Such curvatures have approximately specific boundary limits.
4. The gax are no more an intrinsic part of nature than the lax, max, or numbers. Nor any less.
5. A force matrix as well as a patterned matter-energy configurational hierarchy permeates the matter-filled cosmos and is part of nature (to be discussed later).
6. It is readily seen in Figures 24-1 and 24-2 that compared against the fixed size of the page itself (which may be likened to the fixed regularity of the matrix of the arbitrary lax or max), the two arrows are not at all equal in magnitude. The “regularity” of magnitude of Gaussian systems can be properly understood only when compared against the Euclidean metric. That Gaussian device for gaining identical numerical values for non-identical quantities is clearly seen to be a successful, but totally unnatural and misleading mathematical trick.
7. it is “rate,” not “time,” that is variable.

The speed of light is variable everywhere in the real world. In a true vacuum (the absence of anything at all) there could not even be a light. That “light speed is absolute” in terms of a void which possesses a curvature of its Gaussian space-time continuum was really a desperately confusing delusion.
Chapter 25

The Effects of Gax, Max, and Matrices

What is the result of the straight-line emergence of waves of energy from nuclei which spin within their surrounding density-gradient layers of material? What is a straight line? If I drop a pebble from several thousand miles high, what path will it follow in a vacuum? Straight down, of course. Of course? What line will it follow relative to the moon? A curved line. The path the pebble follows is only one path, yet it is both a curve and a straight line from different cads.

It is our gax-adopted prior restriction that the flight of the pebble is absolute with respect only to its parent matter unit, which in this instance is Earth, wherefore its “real” path is a real straight line. But there are frequently events wherein objects move from the controlled cad of one matter unit into that of another, of a same or different hierarchical level of organization. In those cases, the relative motions become absolute and physically pertinent. It is with cases such as those that we are now directly concerned.

We see that what is a straight line to nucleus A may be a curve, or oblique line to material under the control of nucleus B. Thus, if a pebble moves straight out from the surface of Earth it will rise in a straight line through the variable density ether of Earth’s shell layers. It will enter the density gradient in a path such that an equal number of densa flow across the face of the pebble all the time. But as soon as that pebble rises far enough to enter the exther that is outside of Earth’s matter-unit identity it will find itself moving in a path that is no longer perpendicular to a gradient which has become a standing-traveling wave configuration.
In Figure 25-1 we see the pebble rising straight from Earth, passing through the various density layers which are Earth’s shell layers. These layers are physically centered upon Earth, as to material, energy, and form. Ideally, the pebble therefore traverses equal densa across its front.

As the pebble rises from the tropopause to the ozone layer the earth is rotating. The path of the pebble, the material and density of the ether, and the configurational pattern of Earth all would have rotated equally as part of the matter-unit Earth. The pebble path would continue straight, the abram and densa constant across the pebble front.

But what about the tropopause? An altitude must be reached where the matter-unit Earth has ended. A boundary is needed. There are no physical structures at the limits of matter-unit Earth to ensure a sharp, sudden interface between the unit.
and its environment. The environment is the tenuous, vapory ether itself. That environment is not constrained into a distinct otherness from the only slightly different immediately contiguous layers belonging to the planet. We must conclude, then, that the limit to a matter-unit is somewhat of an abstraction, and that the identity of a unit is not precise. (Non-determinate, if you choose.)

On the other hand, the transition zone between matter-unit and environment is not thick. Compared to the diameter of the matter-unit Earth, the transition zone between Earth’s inther and Earth’s extheric cad is small indeed. Perhaps less than 12 kilometers thick.

In considering the mechanisms of and between matter-units of the same and different levels of organization it suits our purpose to arbitrarily consider that a matter-unit has a clear, well defined identity. We arbitrarily, therefore, suggest and will use the tropopause as the limit to the identity of the matter-unit Earth. We therefore specify that outside of that limit the material no longer has Earth as its privileged gax center.

Figure 25-2.

When we look at Figure 25-2 with all of this in mind we realize that with the flight of the rising pebble, the nature of its environment subtly alters. First it rose
through material at rest to it and Earth. First it traversed an equal density of matter all across its face. Then it suddenly finds itself moving through a material which is no longer at rest to that nucleus. Since the pebble continues to rise perpendicularly to the planetary origin, which origin is rotating relative to the exther, the pebble now finds itself unable to follow either line 1-2-3, as in Figure 25-2, nor path 1-4-5-6 as in Figure 25-3.

It starts out in Figure 25-1 on the straight line up from Earth, hence along the curve 1-4-5-6 of Figure 25-3. But when it rises well past the boundary layer of the unit, it is no longer entering the density gradient perpendicularly to the material of that gradient.

Consider Figure 25-4. Earth moves through a cad whose gax is the solar unit. The pebble leaves its original Earth lax xy, and enters a larger uv gax, Sol. On the max, then, the pebble follows a curve which is at first a straight lax line, and even a straight Earth-gax line with respect to the material at rest to Earth. But as the pebble enters material which moves with the sun, but whose density is layered, still around Earth, it finds itself moving through that material at an oblique angle as in Figure 25-4D. What happens to the abram, the densa across the pebble face, and the path of the pebble on the gax and max? What, how, and why does the pebble?
In Figure 25-5A the pebble is shown rising through material of constant density per given altitude. Across the face of the pebble are boxes 1, 2, and 3 which represent one den sum of material being traversed per unit area. In Figure 25-5B the pebble has entered a zone in which the ether is at rest to Sol. The pebble is now moving obliquely, relative to the ether. This represents the absolute motion of the pebble, since this ether is now its physical, contiguous environment. Were the density of this ether constant, the pebble would still enter equal dinsities of it per unit area of the face of the pebble.

In the conditions outlined for a pebble rising out of unit Earth’s material unity, into material moving relative to Earth, but with a density configuration at rest to
Earth, the medium in Figure 25-5B would not be of constant density. The density of the medium would be represented by Figures 25-5C and 25-5D, with respect to the flight of the pebble. The path of the pebble would not only spiral, as in Figure 25-4D, but the spiral would tighten into a return curve in response to the unequal pressures introduced by the oblique direction relative to the density gradients.

Figure 25-5.

It is quite clear that we have just met Einstein’s theory of gravitation again. Do you recognize the curved space-time continuum? Remember to call it a “density-gradient-curved-path-of-motion continuum.” Here we see a body following a path which must return it to its starting point again, with nary a trace of any gravitational “force” at all. Nothing but a body following its “straight line”
through a “curved space-time.” There can be little doubt that the tensor equation of a gravitational field, the “\( g_{ik} \)”s, provide a neat quantitative representation of this type of “gravity” in terms of gaxes, lines, points, angles, and similar inventions.

Had the Michelson-Morley ether-drift test demonstrated the validity of the cosmically fixed ether concepts this discussion of the flight path of a pebble might be construed as an accurate qualitative explanation of the quantitative gravitational equation of Einstein. Suppose there had really been variations of the speed of light, here on Earth, with compensatory variations in the lengths of rulers and the rates of clocks all at rest in sealed laboratory rooms in carefully controlled motionless environments within matter-unit Earth. Then there might have been an Earth-pervading object-altering ether flow to set up the required conditions to allow”, such an “explanation” of gravity to be true.

As soon as we re-introduce our awareness that the “curvature” of “space-time” is a mathematical way of linearly representing light’s motion through a continuous medium of variable density, we see that the “space” in space-time is really a material medium. An ether. THE ether. For the explanation implicit in this equation to hold true within the limits of the matter-units themselves, that ether must be max-stationary, hence lax-flowing. The unit-pervading flow pattern would take the “curvature.” The old ether-drift is required. Odd.

No ether drift through closed labs. No tenuous hydrogen gas-atomic bodies floating serenely through us, walls, rooms, apparatus, pebbles. An identity, a limit, a boundary layer, an atmosphere, no free ether. How, then, to explain why an object at rest on the table reacts to the gravitational field, the force, to be sure, of Earth? That hiccup of an equation can’t help us here! The tensor was no more an explanation of gravity, a theory of gravitation than was our discussion of the effects of gax, max, etheric-standing waves, and densities an explanation of gravity.

Objects within the confines of Earth, unaffected by etheric motions, do absolutely react to a force of gravity, no matter what their state of rest or motion. Objects within the confines of Earth have as the privileged center of their gax, or lax, Earth itself. If such objects are at rest, then, they are not moving through any space-time continuum, curved or not. Hence they cannot try to follow a curved space-time “straight” line in order to have gravitational mass. They cannot follow a density “curvature” which only exists outside of the confines of the planetary unit.
Chapter 26

Rules and Reasons

Perhaps you wonder why we should spend such a lot of time discussing relation. Why do we so concern ourselves with gacs and macs and abstract geometries at all, you may ask. After all, it is scarcely possible that modern astronomy, which extends billions of light years in all directions, hasn’t already set up some sort of similar max. And relativity has long since announced that the curvature of space-time varies with the proximity to matter. Why such a to-do about relativity, Euclid, rational versus objective concepts, etc.?

Once again we have to go a long way back for our answer. Again, we find Thales near the bottom of the ladder. He was one of the first Greeks to appreciate the importance of mathematics to an understanding of nature, and he is reported to have gathered much prior Egyptian and Babylonian information. The study of astronomy and its mathematical relations had revealed a continuity in nature which could not be reconciled with the discontinuous character of the then known theories. (Sound familiar?)

When Pythagoras later discovered that it is possible to express many aspects of nature in terms of mathematical conceptions alone he formulated the doctrine that the real is number. (If we hook this to the doctrine that the real is space-time, we find: the real is number, space, and time—our three abstract invented dimensions. If we vary this but a trifle, we find: the real is 186,300 miles per second. Zotz! No, the real is really a material-filled space in which wave pressures are transmitted at a speed which varies in max according to the altered sizes and actions of physical objects, i.e., measuring instruments, at specific gax; where the amount of variability is so exact a function of the sorce and dinsity from gax to
gax as to yield exact correspondence through the Lorentz transformation.)¹ With the Pythagorean doctrine that the real is number the development of the relations of numbers and geometrical propositions then proceeded, along with the accumulation of astronomical knowledge, until Eudoxus finally organized the combined findings into a complete mathematical astronomy.

Now the Greeks were forced to recognize that the laws which made astronomy an orderly science, precise enough to make accurate prediction possible, referred exclusively to ideal geometric forms, and said not one word about physical objects. Although Eudoxus warned his contemporaries that the geometrical forms and arithmetic proportions were not to be regarded as real things, the contemporary scientists concluded that since the laws that control the entire astronomical universe were purely conceptual categories of mathematics and logic, then the real is rational rather than physical.

Although we are quite convinced that matter is real and physical, we are equally ready to admit that the regularities of form and pattern, recognized throughout the philosophical and scientific history, are also real. While it is true that these patterns and forms have a material vehicle, it is also true that they largely depend upon energy relations. Since energy, as motion and pressure, can traverse any and all materials, it is to some extent independent. The patterns and forms, then, do govern and control the actions of matter and energy, since they are actual expressions of matter-inergy-exergy structures.

Since gravity is an effect of the relation between inergies and exergies of certain specifically oriented matter-units to each other and to the gax and max relationships involved, this subject is of extreme pertinence to our definitive explanation of the mechanism of gravity.

This is the picture. We have a Cartesian three-dimensional Euclidean coordinate system centered at a chosen spot and time specified somewhere in the cosmos. Scattered everywhere within that master coordinate system we find matter-units and etheric matter of shell-type patterns of denseness. We plot the positions, speeds and motions of the specific units with local Cartesian systems (within which we now can plot the actions of all subordinate components of that unit just as though this lax was again a master coordinate system), whose actions are specified in terms of the max. We also plot the local conditions of given (moving) cads in terms of Gaussian coordinate metrics whose degree of curvatures mirror the conditions of the physical matter-and-inergy of that cad. You will now realize that these curvatures, whether three, four, or x-dimensional, are neither of time, space, length, number, odor, or emotion. They are a method of representing variable density of matter, variable rates of actions, variable smells

¹ Like, “WHAM!!” Daddy-O.
and feelings, all in terms of scribed lines or a mental concept of non-scribable abstract lines. It is the lines that curve, not the objective universe.

RULES
1. “Absolute motion” is motion of anything through its traversed contiguous material environment. (Subject to Rule 8 below.)
2. “Absolute speed” is therefore a speed relative to the traversed material environment. (See Rule 8.)
3. “Relative motion” and “relative speed” are motion or speed with respect to some material which is neither a part of the traversed material environment of the moving thing, nor at rest to that material environment. We find that relative speed is variable, in dependence on rational choice of coordinate centers.
4. When absolute speed is to be measured, it is necessary that the coordinate center be so chosen, and the measuring instruments so mounted that they are at rest to the environmental material of the measured item.
5. “Absolute rest” is approximately that condition in which a specific object is at rest within its contiguous material environment. It is an “approximate” situation in that in order for any object to maintain a specific identity, it must possess many kinds of motions within itself, as compared against the material of the environment.
6. Points, lines, planes, units of length, and units of time are rational inventions. In order for them to yield comprehensible data with respect to physical realities they must be held constant in value and must be centered upon, or coordinated to, the physic conditions of absolute extension, absolute duration, and absolute rest or motion.
7. In order to avoid the confusion which would result from trying to remember the values of abstract measuring units, we always establish physical items as our standards of comparison. The fact that such standards don’t remain forever constant has nothing whatever to do with the constancy of our rationally appointed units. Even the variability of the physical standards can be recognized only by comparison against the ideal forms.
8. In searching out the basis for finding absolute measurements it is necessary that the matter-unit in command of the volume under consideration be chosen as the privileged frame of space. It must be taken as “at rest.” A thing may be in a condition of absolute rest even though its environment is in a condition of absolute motion. In such an event, the thing would be in relative motion to the environment of its environment. For instance: I may be
absolutely at rest inside of a ship, even though the ship is in absolute motion upon the ocean. In such an event, I would be in relative motion to the ocean.  

9. Absolute length is whatever it is at a given time, and it has nothing to do with frames of space or measuring systems. To find it, it is necessary that the thing to be measured be itself taken as the center of the coordinate systems of measurement, and that the physical measuring instruments then be corrected for any changes due to the absolute motion of themselves and their measured item. Such changes occur only in response to absolute motions, and have no dependence on relativity motions. (Or notions, as the case may be.)

10. There is a maximum rate of absolute motion possible through any material environment, but that absolute maximum varies as does the medium. The maximum absolute rate of motion places no restrictions upon the maximum relative rate, which being only comparative, has no such limit.

11. The matter-unit which owns the environmental material is always the center of the physical frame of reference, and it is always to be taken as at rest for any measurements being performed upon things within it. Relative motion plays a physical role only between matter-units of several different levels, where matter-unit 1 is a part of matter-unit 2, which itself is a part of matter-unit 3. Relativity speeds play a physical role whenever the absolute motion of such a matter-unit 1 brings it out of matter-unit 2 and into matter-unit 3. For instance, if you (matter-unit 1) were flying along at 1500 miles per hour in a closed airplane (matter-unit 2), you would be in a condition of absolute rest. You would be in relative motion at 1500 miles per hour, relative to the air of Earth (matter-unit 3). If you now jumped out of the airplane, your relative motion, which had before been ineffective upon you, would suddenly become absolute motion, with drastic physical consequences.

It is along around here that you may begin to find connections between some of the prior sections which appeared to be disjointed from our thesis when you first read them. Indeed, this section could not be understood without your prior introduction to ether of variable density, to the existence and some anatomy of the matter-unit hierarchy, etc. Conversely, those sections in which we introduced those concepts are actually based on this formal approach to the duality of nature, hence could not properly be understood until this section has been read. Our circle is closing.

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1 The role of inertia plays a part in the physical conditions of absolute rest or motion, but it is a complicating role with respect to understanding, and it will be discussed later.
PART IV

The Physiology
of Matter and Energy
The history of philosophy reveals an ancient question, “What is the referent for motion?” This question presupposes an absolute direction of motion, else it becomes meaningless. Since it was rapidly apparent to the ancient philosophers that direction is always relative to the position of the observer, they easily recognized that there is no final absolute referent for universal motion. They then abstracted from the question its essence, “What is the referent for identity?” What causes one object to be other than some other object?

The pre-classical “void” and the classical “absolute ether” have now been eliminated as answers to that problem. We can no longer say that a surrounding void marks out the limits to the identity of a given atom or molecule.

What is a great deal more important, we can no longer properly maintain that the difference between gases, liquids, and solids is tied up with the distance between the individual atoms or molecules. If there are no empty spaces between particles, even in a gas, then there are also no distances between the particles. How, then, can there be particles at all, is the next question.

In accord with a logical demand for a wave energy conducting medium, a demand that has led numerous brilliant physicists to establish and prove many complex mathematical laws as to the actions of such a medium, we have herein agreed that since wave energies are known to travel any and everywhere, material must itself exist anywhere and everywhere. Matter fills all space. An overwhelming weight of evidence convinces us that there must also be atoms and molecules. On the larger level, every grain of sand, pebble, stick and stone, planet and star is a particle. Each possesses a unique identity all its own.
There are no spaces between particles, but there are particles in solid, liquid, or gas matter. Nor can we merely fill the “spaces” with ether because the old M & M experiment would rise to haunt us. Then what is the referent for identity? Or even more specifically, what causes an object to possess identity?

There are several approaches to the answers to this question, since there are several answers. There is no one referent for identity. Moreover, there is no absolute identity either! There is nothing in all the world which is totally and completely independent of other things. All physical objects are continually absorbing and radiating energy. All are continually acting as the center of a field of gravitational force, and all are continually reacting to the forces of other objects. And since field forces are all carried by material fields, there is no ultimate identity to any given object. All are part of the overriding unity that is the physical world. And since there is reason to believe the physical world to be of infinite extent, there is no “identity” possible even to the cosmos.

Nevertheless, we are quite able to decide that any given object is itself and no other object. We are quite able to contemplate the identity of numberless things. How come?

The form in which this question has just been put provides us with the avenue toward its answer. All we have to do is analyze the way in which we do decide upon the identity of separate things. Return to sense.

The first item by which we make our decisions is relation. There is a relation between separate objects such that this one is not within the volume of that one. The second thing we note in deciding upon identity of various objects is their state. They may be liquid, solid, or gaseous. A liquid is obviously not a solid. Hence, if we spy two solid objects with an intervening transparent liquid medium surrounding and separating them, then we know that each solid object possesses an identity relative to the other and to us. And to the liquid. So with solid objects, separated from each other and surrounded by air. Or etheric matter. So with local collections of liquids, lying apart from each other on solid surfaces. Or floating in any space filled with a medium other than that of which the local liquid collections are states.

In brief, relation and state are the referents for the identity of local volumes of ubiquitous matter.

Some would object to this concept on the grounds that it is too simple, too easy. Too very, very obvious. It has exceedingly often happened, however, that the truth truly is so self-evident that it escapes the notice of investigators armed with highly complex and abstract methods of procedure. Ultimate truths are generally of the greatest simplicity. (The difficulties we usually have in finding these truths, and their ease of comprehension after discovery, is a powerful clue to the nature of the human mind. We may pursue it, in time.)
Some would object that although true as far as this goes, it does not go far enough. They would say, “Relation and state may be the referent by which we recognize identity, but what is the cause for the identity persisting or coming to rise in the first place? What is the general cause of identity?”

Although not actually an objection, this is a valid question. The answer is again quite simple. If the question is but slightly rephrased, the answer is almost self-evident. “What is the cause of difference of state and position?” The answer is, “Energy, of course.”

At first glance, this looks like a simple answer. After a long chain of deductions, we shall find that it really is simple. But as of the present theories of science, this answer is most meaningless. For “energy” is a term which defies interpretation in terms of matterless mathematics. Again, if matter is considered to be a form of energy, then to call energy the cause of identity of material objects is as meaningless as it would be to say that “matter is the cause of identity of material objects.” Since science has denied the existence of the ether, and does consider matter to be a form of energy, it can never reach simple truths such as the above. Nor understand them when first seen. Our science, although indispensable for any worthwhile attempt to understand nature, cannot be taken “pure.” It cries for reinterpretation.
Matter. Matter has several basic properties: (1) It is expandable. (2) It persists eternally. (3) It conducts energy. (4) The more it is compressed, the stronger it resists further compression.

In that it is the indispensable vehicle for energy, and in that energy and matter are the indispensable relata for relation, and in that these three basic items of nature are the indispensable requirements for the existence of the final basic, conscious life, it may be said that the physiology of all else is also the physiology of matter.

Energy. Energy has two primary forms—motion and pressure. That which presses and is pressed is always matter. That which moves is either matter or pressure of, by, or through matter.

There is a basic positive tension, a pressure, that permeates the universe. This sorce tends everywhere toward linear constancy, but the myriad actions of its conducting material offer endless variety to the local sorce. That variety, in the attempt toward equalization, is itself the cause of motions and variable pressures.

The fact of motion always is accompanied by alterations in the energy of the traversed material environment. Such alterations constitute fields of force.

There are many levels of organization in the matter-unit hierarchy. There are also many different secondary forms of energy. The primary forms of energy (motion and pressure) can exist anywhere, in material of whatever state or form. The secondary forms of energy require certain levels of organized discontinuous materials to become demonstrable. They differ from each other mainly in the size
of the action, and of the configuration which is engaged in absorbing and releasing it.

The forms of energy are all interconvertible. Once in existence, energy seems permanent.

Some Major Properties of Energy

1. Static pressure tends ever to equalize. If there should exist a pressure differential between two contiguous zones of matter, the tendency is for some of the material to move so as to equalize the pressure.

2. Energy seeks ever to maintain a constant abram, whereby it traverses an equal density of material along the breadth of its path. The paths energy will take therefore depend on the density and structure of the traversed medium.

3. Matter or pressure in motion exerts less pressure upon the environment perpendicularly to the path of motion than does the same matter or pressure when static. The pressure decrease, laterally to the path, is quantitatively dependent on the speed. This is known as the Venturi, or Bernoulli, effect.

These three properties are responsible for the existence of matter-units. It should be noted that the properties of energy are to some extent, properties of matter. Matter and energy are mutually dependent in their actions and reactions. Between them, any cause is also an effect.

From these properties it will be recognized that the density patterns of material depend upon the energies present. The more the energy, the greater the amount of organization of the containing material, thus the greater the ability to do work.

A given amount of material has a variable mass, depending upon the amount of organization into density patterns. Since matter organizes in response to energy, mass depends on the amount of energy the given amount of matter contains. In that “mass” thus is a measure of energy, it is correct that mass and energy are interconvertible. As thus used, however, “mass” is not a measure of amount of matter. It is a measure of the comparative effects of the relative amounts of organization present. Weightless and massless, matter does still continue to persist with its primary qualities unchanged.

The configurations of material depend upon the energies present, and the paths of these energies (whether they remain “present” or not) depend upon the density patterns of the containing material. A circle of cause and effect.

With the postulation of “sorce” as a general pressure permeating the cosmos, plus its resulting Venturi effect for any and all motions, the mode of action of all
of the secondary forms of energy can be explained and understood. Among such secondary manifestations of motion and sorce are:

1. Gravity
2. Nuclear force
3. Electromagnetism
4. Chemical valence bonding energy
5. Heat
6. Pressure. There is a secondary form of pressure, in which other factors than sorce are the pressure cause.
7. Flowback, or “resorce.” (For lack of a known term we shall call the interstellar result of the release of matter out of its intheric form “flowback.” The release of inergy as its matter-unit is destroyed provides additional sorce to the environment. We shall show that the combination of flowback and “resorce” provides the basis for a “steady state” cosmos.

The initial goal of this work was to provide a qualitative explanation of how the gravitational effect occurs. The investigations leading to such an understanding demonstrated that the nature of the responding items must be totally discovered and the nature of the causative agent totally explained before gravity can be understood. Accordingly, the scope of this investigation had to expand from a search to understand just “gravity” into an endeavor to understand the general basic physics of just about everything.

In the ensuing discussions regarding the mode of operation of the secondary forms of energy, we find that they are all similar effects which appear at different levels of the matter-unit hierarchy. We find that all of them, at their own level, act alike. We find that all of them are interconvertible.

According to the present second law of thermodynamics, heat is supposed to represent the lowest ultimate form of energy, into which all other forms must eventually fall in a universal “heat death” of the cosmos. But we have discovered no essential primacy in the various levels of the hierarchy. No one level is prior to all others. All come and go, are createable and can be destroyed from time to time and place to place. If the secondary forms of energy differ mainly in the level of unit to which they belong, and no level has a priori privileged status, then there should not be anything “ultimate” about heat or any other secondary energy form.

Because heat is thus of such importance to the philosophy of physics, we shall concentrate on heat in our explanations of the mechanisms of the secondary forms of energy. But in that process, with occasional skipping back and forth from one secondary energy form to another, the explanation of gravity remains our primary goal.
According to present theory a solid is made of tiny particles (molecules) and intervening voids. The molecules vibrate back and forth, at a certain average rate, in an otherwise fixed position. The rate at which they vibrate is what we measure by temperature. As heat is added to the solid, the added heat is the additional motion of the vibrating molecules. They move faster. Under the increased pressure of the rebounding molecules, each molecule pushes (by its momentum) the others further away, wherefore the entire solid expands, and is hotter.

When the molecules reach a certain speed, the addition of more “heat” causes them to overcome the “molecular attraction” which maintains them in approximate position as a solid, and the solid melts into a liquid. The solid becomes a liquid, it is held, by virtue of the fact that the individual molecules no longer remain in approximately fixed places, but instead have overcome the molecular attraction just sufficiently for them to slide all over the place, while still remaining within the confines of the gross liquid. Although the molecules bounce all over the place, they still remain together.

Additional heat (faster motion of the molecules) can be absorbed by the liquid up to another certain speed, at which the addition of more “heat” is absorbed in “overcoming the molecular attraction” and the molecules jump right out of the liquid and flit anywhere at all, thus forming a gas.

There are a number of faults in the assumptions premising this theory, as well as some omissions in the explanations itself. It is assumed that (1) molecules are unchanged through these series of actions, (2) the molecules each possess a
separate, “solid,” independent existence, (3) there is an absolute void between the atoms or molecules, (4) “molecular attraction” extends across and through that void, (5) the molecules are perfectly elastic, so that they can forever bounce off each other without any net loss of particulate motion, and (6) heat being merely the motions of particles (molecules), it is transferred from one material (the hot, fast-moving molecules of the fire) to another (the absorbing body) by the contact of fast-moving against slow-moving molecules.

The omissions of the explanation are at least these: (1) It does not explain “molecular attraction,” and (2) it ignores radiant heat, which can traverse any place whether or not molecules or atoms are there.

The kinetic theory of heat fails to hold water even within its own terms. For it can’t possibly explain heat of vaporization, or heat of liquification. For example, given a hot gas applied to the heating of a cold solid. In terms of the explanation, the fast-moving gas molecules continually strike the molecules slowly vibrating in the solid, thereby increasing the speed of vibration of the solid’s particles. For each increase of momentum of a molecule of the solid, there is an equal and opposite change of momentum of a molecule of the hot gas. But at a certain point, the temperature at which the solid melts, the hot molecules continue to slow down on striking the solid, but there is no increase in the speed of the solid’s molecules. “Heat is absorbed in overcoming the molecular attraction,” it is said. But this is clearly impossible if heat is nothing but the motions of the respective particles. How can the motion of the hot particles be absorbed without any additional motion of the solid’s molecules, if particulate motion is what heat energy is? Or, if heat is nothing but particulate motion, how can it be absorbed without any change in the motion of the absorbing particles?

The complaint that the kinetic-molecular theory of heat does not account for the nature of the heat which is absorbed without changing the kinetic energy of molecules may have been somewhat difficult for you to understand, since you may still think it is used to overcome the molecular attraction, “whatever that may mean. To pinpoint the objection even finer, consider the case of that singularly unusual metal, iron.

In addition to possessing the rare quality of sometimes being a molar body magnet, iron has another odd property. Except for water, all molar bodies expand at a regular rate when heated. They expand so much per unit of added heat until they reach the temperature of liquification at which they absorb a great deal of heat without getting any hotter. Instead of getting hotter, they expand again and become liquid. As liquids, they again expand as they absorb heat, until they reach
the temperature of vaporization at which they absorb a quantity of heat, again without getting hotter as they expand and become a gas. As a gas, they absorb heat and expand accordingly again. It is at the points where they change state with a rapid expansion, but no increase in temperature that it is said the additional heat is absorbed in overcoming molecular attractions. It is the fact that there is a change in state of the material that leads to the belief that (1) the difference in state is merely a change in the freedom of movement of molecules, and (2) the additional heat is used in overcoming the inter-molecular energies which had kept down that freedom of movement.

The odd property of iron is that as a solid it will expand so much for each additional unit of heat, as other solids do, but only until it reaches a temperature of about 3400 degrees F. At that temperature it absorbs a great deal of heat, expands enormously, but gets no hotter. Nor does it become a liquid! Iron can absorb heat without changing state or getting hotter.

Now, if iron absorbs this heat without changing state, then it can’t be true that the iron molecules have overcome their attractions so as to move liquidly around. Which means that this heat has been absorbed with no molecular attractions involved. Since this eliminates the claim that the kinetic energy of the heating source’s molecules has been used other than in increasing the speed of the iron’s molecules, it should follow that the iron molecules did, therefore, increase in speed. That increase in speed would account for the expansion of the iron, but it utterly denies the proposition that the increase in temperature is nothing but such an increased speed of molecular motion.

It has been theorized that heat is actually nothing but the motions of the molecules in a given material. That theory requires that the kinetic-atomic-plus-void theory of matter be correct. Which it isn’t. Heat is a secondary form of energy. Energy is carried by matter. There are two forms of matter, continuous and discontinuous. Heat therefore must have two forms, wave form (radiant heat) and particulate (kinetic atomic).

There are no void spaces in a molar body, hence there is no place for changeless molecules to move. The only way they may move, therefore, is by changing shape and flowing by one another. Since the difference between a solid, liquid, and gas can’t possibly be just the amount of space between molecules (since there is no such empty space to begin or end with), it must be a generic difference in each and every molecular constituent of the body present. In short, a
molecule (or atom) must be able to assume any of the three states—solid, liquid, or gaseous.

Our definition of these three states of matter was based on sense evidence. That shows a difference in the ability to hold a shape, to flow, and to maintain a given volume. We now assert that these differences of state are inherent even in a given atom, and that the changing energy patterns in such an atom are the cause of such differences of state. Later on we shall modify this position as the explanation of both molecular attraction and the differences of state progresses.

In a molar body no molecule exists in total independence. All are always in contact with more of the material of the molar body. When a molecule moves, it moves through, or vibrates against material. There are always displacement effects. There is always a field energy accompanying any particulate motion, so heat can never be just kinetic molecules.

The contiguous material against which molecules do move is not made of molecules, so the energy called “heat” affects sub-molecular matter. The field energy accompanying said molecular motion exists within the entire molar body, which therefore has part of the energy. The energy called “heat” must therefore affect not only molecules as units, but also the molar body level of organization as well as the continuous material of which the molecular parts are composed. While it may be true that heat is primarily a molecular energy, it must also affect matter-unit levels on both sides of the molecule. Part of our job is to show how all these things occur.
A matter-unit is a persisting configuration of inther and inergy organized into an equilibrium with the sorce of the cad. There is a very dinse, spinning nuclear core, filled with circulating wave inergy. Around that core a series of layers of material exist. Those layers show a pattern of steadily increased thickness, with the departure from the core, and an equivalent decrease in dinsity. Said dinsity decrease shows a macroscopically steady square-of-the-distance quantitative rate, but is composed of smaller-scale variations of rate of decrease in harmony with and as part of the layered shells. The nucleus has a sharp dinsity gradient also, and that gradient is responsible for warping the path of the intrinsic inergy waves into their persisting pattern. The spin of the core, together with the effects of the circulating waves on the surrounding ether, help create the sorce-imbalance which causes the Venturi effect. In that effect, the change in pressure between the core and its environment is met by a contraction of the core, an increased rate of spin of that core to maintain a constant angular momentum, and the consequent influx of exther that forms the dinsity shell layers.

It is evident from successful experimental confirmation of parts of Einstein’s equations of relativity that the amount of energy required to increase the dinsity of matter increases according to an escalating curve, so that the dinser matter gets, the more energy is required per unit of increase.

Accordingly, there will be a stage of nuclear dinsity reached such that more inergy is needed to further condense that core than is obtained either by the further contraction and increased spin or by any other means. At that point the unit has become stable and in equilibrium.
It should be further evident that this equilibrium point is compounded as much by the density and exergy of the cad, by the inergies and inter-effects of each and all layers of surrounding inther, as by the inergy and intheric dinsities of the nucleus itself.

As part of our discussions it had been pointed out that the abram of both particles and waves require that the paths of motion will curve in response to variations of density or density of the traversed field. The dinser the field and steeper the gradient, the sharper the curvature. ¹

It had also been shown that in response to the passage of the nuclear nodes in their rotational curved paths, dinsity and inflow-outflow effects are induced in a shell-layer forming pattern. This requires very specific resonance wavelengths for the “electron” shell layers and their specific nucleus, as well as between all such layers around a given nucleus.

The equilibrium pattern of a unit, thus, exists between the parts of said unit as well as in harmony with the environment.

A given matter-unit thus has a dense nucleus surrounded by layers of material, with a series of inter-related inergy waves in each layer and in all layers. There are minima and maxima of containable inergy in each such layer. The actions of flow-pattern of material in closed Venturi tubes show some startling speed inversions, such that once certain speeds are attained and then boosted, the original speed seems to become a firm “minimum,” an equilibrium, for that tube. Great interferences are required to alter that rate through the minimums. Similar maximums are likely to exist. If the limit is passed in any given layer, whole series of sudden transitions must follow in the quantitative structure of the whole unit regardless of size. We shall investigate this in more detail in Chapter 36.

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A large body of experimental work has demonstrated that all known forms of solid matter are compressible, wherefore any specific atom can have a continuous range of volumes. Under 100,000 atmospheres of pressure potassium shrinks

¹ Those competent and interested in quantitative aspects should be able to find the correct formulae for these actions, and may even succeed, from extended study of those specific equations, in discovering all further quantitative expressions for inanimate nature.
more than half its volume, and cesium nearly two-thirds. The evidence is that there is no sort of limit to the compressibility of matter up to available pressures of 3 to 4 million atmospheres.

Since there are no void spaces between atoms, the only way that a solid can be compressed is that all of its components are themselves compressed-molecules, atoms, layered electron-shells, electrons when present, nuclei, nuclear shells and nodes, et al.

The compressibility of matter is a premise, a conclusion, and an experimental fact that permits us to assert with no fear of meaningful contradiction the prime premise that every wave energy has a material conducting medium. Let us apply it to a consideration of the actions of gases.

Why Does Air Remain a Mixture?

Air is a mixture of gases. The many gases freely intermix and remain equally distributed as “air.” Why don’t the different gases settle apart and stratify according to weight? It cannot be the wind that mixes them since they remain equimixed even when in closed chambers. Nor can they fly into the no spaces between one another.

Some equilibrium requirements to remember as we work out this problem are: (1) The outermost molecular shell-layers (which compose the shared minimum dinsity-energy background of the cad) must be equal in inther-inergy among the gaseous molecules that comprise a gas. (2) The level of that cad minimum-strength background “matrix” is its pressure. (3) The amount of inergy required to attain a cad matrix strength of “unity” will vary as between different unmixed elements since the inergy per element varies with its dinsity and atomic weight in accord with its specific heat.

Air has gaseous molecules of several different intrinsic heat inergies present at any given exergic temperature. The inergy of the air, say 70 degrees, is expery to each and every molecule present, although it permeates all of them as a body. The quantity of inergy of each molecule at that 70 degrees depends on the element represented. All of the molecules present are in motion among each other, and are touching one another. This means that at various times any given molecule can be in contact with any other molecule, regardless of the kinds of gas elements present. Wherefore the gas molecules of any element A or B or C will, at various times be each other’s environment.

Some mechanisms begin to be suggested. Some inergy exchanges begin to appear likely, as between contiguous gaseous molecules of different inergies, but
shared outermost material matrices, in a common heat-level exergy field. If there are energy exchanges between molecules of air, and energy is the cause of matter-unit existence and condensation, can it be that at a constant temperature a gas molecule 1 gains mass from gas molecule 2, of a different element, so as to cause both molecules of gas to end up the same weight? Hardly likely. No, that mechanism requires far too drastic an atomic upheaval to be the mechanism steadily and endlessly enacting itself in our lungs and atmosphere. Instead of atomic energy, low-level molecular energy mechanisms must be involved.

Avogadro’s Law and Number say that at the same temperature and pressure all gases have the same number of molecules per unit volume, and that the weights of those equal volumes under those conditions are direct reflections of the atomic numbers of the gases.¹

If a unit volume of oxygen has the same number of molecules in it as that same volume of hydrogen, nitrogen, chlorine, etc., then, since there are no empty spaces present, each and all of these molecules must be of the exact same size (even if only statistically). Yes, the conclusion is inescapable that equal volumes of pure gases have equal numbers of molecules of the same size present.

But we know of several very important differences between these, different gases. They have the same size, when in pure collections at a given temperature, pressure, and volume, but they differ in weight, in quantity of inergy and inther, and in specific heat (thus even in amount of heat energy required to reach the common temperature.)

So we see that molecules of different gases have the same size at constant temperature and pressure, so long as they are isolated from each other. We are now ready to find out why they freely intermix when released into each other.

The answer as to why the air does not stratify into layers of gases of steadily lighter weight is allied to that of an apparently remote and unrelated question. Why do the waters of the Gulf Stream remain a separate coherent body as they flow through thousands of miles of the same molecular chemical?

The only lasting difference between the Gulf Stream and its ocean bed is the heat inergy. The Gulf Stream is hotter. Why should this keep the water molecules apart, when “hotter” molecules are merely supposed to be moving faster than cooler waters? According to that idea, it would seem more likely that the hotter the water, the faster moving its molecules, the quicker it would diffuse into the surrounding sea and be lost.

Consider this: A given unit volume of a gas is heated. Result: Increased temperature and pressure, same (closed) volume. Now allow the steps required for the pressure to return to unity. Requirement? Enlarge the volume. Result? Same number of space-filling molecules, more volume. Meaning? If the molecules now occupy more space, then, ipso facto, they are larger. Each of them.

Hotter molecules are larger. A body of large molecules can easily remain coherent as it moves through a body of smaller molecules with a different energy and density. Indeed, the only difference that can keep the close-packed water molecules separate from the equally contiguous colder waters around them is the size per molecule in the two assortments. Ocean molecules are colder, hence smaller than Gulf Stream molecules.

How does this explain the diffused state of the gases that compose air? It requires a grafting of this explanation of ocean versus Gulf Stream upon the considerations concerning Avogadro’s Law.

Larger molecules, as compared to the same molecules when smaller, are lighter per unit volume.

Consider one liter of oxygen at pressure and temperature of x, and another liter of nitrogen at the same temperature and pressure. There are, say, 100 molecules per liter, all necessarily the same size since they occupy the same total volume.

In the flat pictures of Figures 30-1 and 30-2 it is shown that the outer shape of the oxygen molecules is cubic, while the shape of the nitrogen molecule is hexagonal. (This is only a schematic representation of two of the possible shapes, rather than of the true shapes of these elements.) The matrix in Figure 30-1 is seen to be merely the outermost, touching, perhaps even shared shell layers of the molecules, and it constitutes the minimum inergy-inther-density network of that cad. (The cad, in this case, is the liter-volume and contents.) Remember this: (a) The atomic nuclei—small dots in Figures 30-1 and 30-2—are extremely small compared to a molecular volume. (b) The shells double in thickness as we leave each nucleus. (c) The outermost layered shells are thus the thickest, wherefore the matrix constitutes most of the component structure of the gas. (d) The density and inergy of the matrix is in sorce equilibrium between jar pressure and nuclei effects, and is the minimal density-energy level in the jar. But the nuclei of heavier elements are possessed of greater energy. Greater energy means more nodes, more spins, greater concentration of material per unit volume, more mass. (e) . . “the quantity of heat required to produce a given change of temperature depends upon both the mass and the nature of the substance, or the heat required per degree rise of temperature varies as the mass of the substance times, a constant whose value is determined by the nature of the substance heated.”

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Figure 30-1.

Figure 30-2.

Figure 30-3.

Figure 30-4.
A very high level question arises here. One so close to the top of the theoretical structure as to make it almost the beginning and end of the whole works. The question is—How can one element’s gas molecule have the same volume, the same doubling pattern of shell thickness, have its outer shell of the same density and energy as another element’s molecule at the same pressure and temperature, yet be denser than the other one?

Consider the following:
1. Different gaseous elements have different intrinsic heats.
2. The intrinsic heat varies as the mass, and thus as the density.
3. More energy (heat) is therefore required to get oxygen to 60 degrees C. at 14 pounds per square inch pressure than to get hydrogen there.
4. But one liter of both gases so conditioned contains the same number of molecules of the same size and pattern, and in each collection the matrix layers have the same pressure and temperature.
5. Question: How can the density of two molecules of identical pressure, temperature, pattern, and size differ when the pressure and temperature represent the physical conditions of the outer matrix layer?

The answer is reached in a series of steps. Step 1: Even though the pattern is the same, the size of the components of that pattern can and do differ. Although the pattern of the sun-unit is similar to that of the neon atom, no one claims that...
the shells of each are the same size. The size and internal pattern of two gas molecules can be the same, with a doubling of the ratio of sizes of all layers, a spinning nucleus, etc., but the thicknesses of the respective parts do not have to be the same. The outermost layer of the heavier molecule can have the same pressure and temperature as that of the hydrogen molecule, but be thinner. Decreasing according to pattern, the sizes of all comparative inner layers will correspondingly differ. Accordingly, the oxygen molecule, or atom, will have more layers before the nucleus is reached. The nucleus will differ similarly.

A molecule or atom with more layers in the given volume than another must have some denser inner layers with more inergy, even if the outer layers were of equal density and inergy. This is illustrated in Figure 30-6.

![Figure 30-6](image)

Step 2 starts with a question. Can the matrix layers of the oxygen container differ in density and inergy from those of the hydrogen even though both containers have the same pressure and temperature? If the jar pressure is the same for both elements, then their matrix-layer inergies must be the same. But this cannot be so! It takes more pressure per shell to counter the expansive tendencies of a denser nucleus with its escalating curve of contained inergy, doesn’t it?

What role does sorce play here? Sorce is constant throughout the shell matrix of both jars. It is even constant at any given point in either jar. The sorce is the same per unit area in the cans. Sorce is not the answer.

OK. Here goes.
1. There is a constant pressure throughout the volume, hence equal pressure per unit area for all shells.
2. There is an identical number of molecules per liter at a given temperature and pressure, regardless of mass.
3. But intrinsic heat depends on mass. More heat is needed to reach the given pressure and temperature.

4. What is heat?
   Heat is a form of energy.
   What is energy?
   Energy is motion and pressure.
   If the pressure is the same, but intrinsic heat is greater, what is it that is greater?
   Motion is greater.

5. More motion is required in the outer shell of a heavier molecule for the pressure to be equal to that of the lighter molecule.

6. But in a gas, the outer shell is the cad matrix! There has to be more motion in the matrix of the heavier gas than in that of the lighter gas at the same pressure and temperature.

7. What happens when two such gaseous elements are mixed? It is impossible to have a common cad matrix possessing different amounts of motion and different density per unit molecule. Even if two different motions and densities coexisted in the matrix, that very mixture would be common to both sets of coexisting molecules.

8. Mixing matrices of different density and energy will synthesize a new matrix whose density and energy will be the resultant of the total energy, inther, and matrix volume made available. The final sizes of the mixed molecules must then adjust accordingly.

   If the sizes of gaseous molecules of common temperature and pressure vary according to the nature of the contiguous molecules, so that a heavier molecule expands at the expense of the lighter one, then the displacement weights of such contiguous gas molecules will approach a common value. If they can attain a common displacement weight by such size changes, then they will remain intermixed. The direction of change of size of heavy and light intermixed gaseous molecules will be opposite to each other, proportionate to the difference of unit-mass of the two elements, and toward a final value dictated by the averaged physical conditions of the common matrix that is produced by the mixing.

   Let us allow that the matrix layers in Figure 30-1 (page 206) are shared, as in Figure 30-7. In this case, the matrix layer is held in common, and thus is a cad matrix for all the gaseous molecules present. Since they are all alike, being the same element, the thickness, density and energy of the matrix are proper for the equilibrium up and down the line.
But the introduction of one nitrogen molecule, with different physical requirements for its outer-layer, upsets the apple cart. When the nitrogen molecules and oxygen molecules are allowed to intermix so as to become each other’s environment, the matrix layer must attain a new equilibrium that will provide a harmony with all layers and nuclei, up and down the line, through and through the units.

To do this, a compromise “thickness” must be reached. If it is between the thick layer of element 1 and the thin layer of element 2, then, to maintain its own internal equilibrium harmony with the pattern of a unit, each molecule must adjust accordingly. Result: The dinsen unit with the thinner outer-layer will expand to reach equilibrium with a thicker matrix. The less dense unit with the wider outer-layer will be condensed into equilibrium with a thinner matrix. Result?!

Air is a mixture of gases, in which all the molecules displace an equivalent amount of “Eureka.”\(^1\)

\[^1\text{See Archimedes.}\]
In Chapter 17, in which the composition of the molecular structure of a gas was begun, we saw that the ether becomes “claimed” by various molecular nuclei, and that the firmness of the “claim” depends upon the density of the material, as well as the patterns and amount of energy.

Time to put some things together.

1. The inther of a shell can absorb energy in a smooth range, within minimal and maximum levels. Past those levels the shell undergoes a sudden sharp transition of density and inergy saturation per internal unit volume with corresponding changes of thickness and state.

2. When a given layer undergoes a change of that kind, it has altered itself out of the sorce equilibrium required to satisfy that of the rest of the shell-layers of the unit.

3. A complete reorganization of the unit must then follow, step by step up and down the shell-layer equilibrium pattern.

4. With a change in the inergy of its surrounding shells, the size of the nucleus must vary accordingly.

5. Within limits, then, a molecule can undergo certain amounts of smooth variation of size when certain kinds of appropriate energies are continuously gained or lost in its shell-layers. But sudden size changes occur if the amount of energy transcends those allowable limits.

6. The continued exchange of inergeries between molecules, and the endless conduction of exergeries through those same molecules, at constant temperature and pressure would cause a statistically constant amount of the jerkiness of orbit (shell-layer-boundary) position changing, with certain specific portions of inergy gained or released as the shell-layers, wave by resonating wave, performed the one-by-one changes of inergy-inther-thickness required to reach that state of internal and external sorce-equilibrium in which pressures from all directions are effectively equal.

II

We see that the high level question on page 206 is wrongly put. Its premises are the implicit conclusion that temperature and pressure measure the density and inergy of the matrix layer, whereupon at constant temperature and pressure the density and inergy would be the same, regardless of the elements present.

The importance of the question lies in its direction. It directed us toward considerations that do answer the question of how and why the gases of air remain intermixed rather than stratifying out by weight. But it also directs our attention to
a closer examination of the physical implications and meaning of most of its words.

What does “temperature” measure? Not heat energy, for the amount of heat energy differs for each different element, at a given temperature. If heat energy is motion, as in answer 4 on page 209, then what moves? The pressure increases when a gas is heated. What does the pressure represent? What causes the pressure? What is the mechanism by which the molecules of a hotter object expand? What gets “hotter”?

If the density of the outer layer, as well as that of all inner-shells, depends on the relative source-pressures, and that source-Venturi-pressure is dependent on certain rotary motions in those layered shells, why and how does the addition of motion (heat energy) cause an increase in local source and/or an expansion of the matter-unit? An increased rotary motion should cause a decreased pressure!

As we explore these subjects, we shall have to face an even sharper question. The sizes of our molecules vary according to the nature of their matrices. The “nature” of a matrix represents its density and inergy. Density can vary with the square of the distance from a source, thus presenting a smooth gradient. The densivity is a function of the inergy. “Inergy” is energy.

If the energy and density of the matrix layers can vary in a smooth gradient, then so can the size of a matter-unit. If the size of a unit can vary in a smooth fashion, then so can the size of all layers, hence the distance of each boundary from the surface of the nucleus. Which means that the orbits of electrons can be at any distance from the nucleus, as conditions vary, so long as they remain in the same proportion of distances with respect to each other. Wherefore it does appear that energy can vary according to a smooth curve, and electron orbits can exist at any given distance from a nucleus of an atom. Where are the ultimate discontinuities of energy that present theory asserts?

We have seen that there are errors larded all through existing theory, and that relatively tiny corrections often gain enormous advances of understanding. We may not feel comfortable in placing full weight upon any given accepted theory, but that does not give justification for completely ignoring the entire quantum basis of physics. No better justification than Physics had for ignoring the tremendous store of mathematically organized and experimentally confirmed data dealing with the existence and actions of a physically real material ether.

Quantum theory says that the orbits of electrons can only exist predetermined, whole-number-multiple intervals. It says that the can be no intermediate positions for such orbits, but that they are either here, or—instantaneously there. Quantum theory says that energy is essentially discontinuous. Particulate. “Atomic.” Electrons and protons. Photons. Quanta. Quantum theory has it that energy and
matter are particulate, that voids interpose between “particles,” that “heat” is the bodily motion of molecular-particle and that radiant heat comes in packages.

In our discussions about the mechanisms of secondary energy, with heat as the sample form, we have ignored such quantum theories. We have ignored Niels Bohr. We have ignored Brownian motion, which is interpreted as visual proof that spatially separate molecules do exist, and fly about in space as “heat.” Is it safe to ignore such factors?
Chapter 31

Brownian Motion

“Brownian motion” is the erratic movement of tiny, visible particles suspended in fluids. The particles move in jerky paths, with sudden changes of speed and direction. The motions of these suspended particles have been considered visual “proof” that invisible little other particles must be bombarding them. These other particles are then postulated as being the component particles out of which the liquid is made, hence must be its “molecules.”

Anyone looking at such particles undergoing the easily recognized Brownian dance might be struck by the relatively enormous distances the particles can move before being “struck by a molecule.” In relation to the size postulated for such molecules, the visible particle moves what could be hundreds of times the length of the liquid’s molecule ere being hit. It is difficult to believe that the particle we see suspended in the liquid is actually floating in an utter vacuum between those relatively distant meetings with occasional molecules. Far from being a “proof” of the reality of pellet-like molecules, to the unprejudiced eye Brownian motion requires that something other than the continuous body of the liquid must cause it. If, indeed, a liquid is made of molecules, and a particle is suspended by those molecules, then the erratic changes of position and direction of the suspended particles would argue that something having to do with the internal structure of the molecules is happening; or that perhaps some totally extrinsic agencies, such as the chance passing of cosmic rays through the area, the transmission of radio waves, light rays, internal or irradiated heat waves, chemical changes, atmospheric pressure changes, or any of a number of other possibilities are at work.
To the unpredisposed viewer, the very least likely explanation is that the apparently continuous liquid which supports the visible particle is actually not there at all, except for an occasional void-filled molecule that now and then bumps the void-surrounded lonely bit of void-filled stuff.

To the viewer steeped in the lore of this book, the particle is known to be suspended in a loving embrace of ubiquitous material. The liquid molecules are in tight contact at all times with this particle. The fact that the Brownian motions have been plotted and measured, the weights of the visible particles also plotted and measured, and the data so attained then been used as a basis upon which pellet-like molecules’ weights and then even atomic weights were obtained . . . . . . . . . . . . YI !!!!!!

IT COULD NOT BE MOLECULAR BOMBARDMENT that causes Brownian motion, because:
1. There are no spaces between molecules in a liquid.
2. There are no pellet-like molecules in a liquid, because the liquid’s molecules are themselves fluids.
3. There are thus neither particulate molecules nor empty spaces through which such projectiles could hurtle in a liquid.

The bombardment can come from internal parts of the molecules or from completely extraneous features of the cad. The one item that is totally ruled out by the anatomy of matter is that individual solid molecules are bodily bombarding a particle suspended in a liquid.

The errors here recognized as present in the various dependent and consequent portions of chemistry and physics are probably small since the least dinsese (though widest) molecular outer-layers are left out of the calculations—but the errors are there.

In principle, the error is infinitely great. It may not have been very important to quantitative theory, but to any qualitative analysis it was no error, it was the wrong ballpark!

If the structure and internal reactions of molecules are such as to produce motions of particles submerged among them, is it necessary to believe that such Brownian motions are caused only by the bodily attack of separate, solid, perfectly elastic molecules? Nonsense! We know that there are no empty spaces between molecules in the first place. There is no place then, in which such molecules could flit about. Nor in which such particles could obey Newton’s imaginary first law of motion while waiting for another molecular blow.

Indeed, the observed fact of Brownian motion of particles suspended in a molecular continuum shows that both the particle and the particulate parts of the molecule must coexist in a common molecular matrix layer. Or in several such layers.
We saw that “temperature” measured some aspect of heat energy. It does not measure pressure so it must measure motion. But motion of what, we asked. What moves within the molecule, and can cause particles suspended therein to change their paths?

Heat is beginning to show itself (1) as an action of the matrix layers of a molecular continuum, (2) as the motions of sub-molecular portions of the individual molecules, (3) as an effect on the molecular continuum itself, as demonstrated by the pressure changes the molar objects undergo as the heat level changes, and also (4) as a portion of the “electromagnetic wave” spectrum. We have begun to see how it is an action within, between, through, and beyond the molecules, rather than merely their matter-unit motions.

If molecules are not discrete, solid particles flitting separately around in a molar body (liquid), how can they be responsible for bombarding little bodies floating within their paths? If Brownian motion can’t be caused by particles bombarding bodies (since there are no such discrete particles to start with), then what does cause such motion? It is time for a simple experiment.

The experiment requires a hand-attached vibrator. (The kind you massage your skull with.) It requires you and a room in addition. Plus an electric power source to run the machine.

Attach the vibrator to your hand and turn it on. Note the rate at which the motor runs. (Listen to it.) Now gently place your hand on the floor. No change. Now press harder and harder. You will note that the vibrator suddenly slows down enormously, to again run at a constant but slower speed. Varying the pressure against the floor will yield no intermediary speeds of the vibrator, it will either run full speed or at the slow speed.

Indeed, if the vibrator is strong enough, it will just continue to run at a constant speed no matter how hard you press it. But if the motor is of appropriate strength, it will run at either of two speeds, depending on how hard it is pressed against the floor.

What is the significance, if any, of this experiment? If nothing else, it provides a guide to our thinking. It suggests that a given amount of energy (the motor) will cause an action on the part of a given amount of material, and that when an additional amount of material is attached to the motor (by pressing it upon the floor) the action will change to a new constant amount.

In this experiment it is seen that there are discrete levels of vibration possible. There appears to be a discontinuity of energy. There is a two-fold discontinuity apparent. First, there are the two discrete rates of vibration. Second, there is the transition period during which the rate is changing. If we kept adding material to the attached field of influence of the vibrator again, there would probably be
another point at which the addition of more material would again cause a change in rate with another transition period. The transition periods are discontinuous.

Is it therefore correct that energy (the rate of vibration) is discontinuous? No. The amount of energy supplied to the machine had been constant. Indeed, it could have been varied over a smooth curve. The discontinuous reactions had nothing to do with the supply of energy at all. It depended on the fact that discrete amounts of material were added to the machine. It was the add on of material, not the energy, which was discontinuous!

(This brings quantum theory under suspicion.)

What has all this to do with heat? Well, heat is the form of energy which affects molecular matter-units. Those matter-units are composed of discrete layers of material enclosing discrete nuclei. Is it not remarkable that energy (heat) can be absorbed by such a unit in a smooth curve, for awhile, but that at certain intervals dramatic changes occur, with the “absorption” of large amounts of energy? Is it not noteworthy that whenever a shell alters its size (in the language of chemistry or physics, when an, electron jumps from one orbit to another”) there is a discrete burst of vibrational wave energy released or absorbed?

Let’s put it this way: A molecule is made of layers of matter arranged around layered nuclei. Energy is a motion or a pressure within and through that matter. The molecule always has within it a complex of wave motions which maintain the form of the molecule. The addition or subtraction of energy alters that complex. There are certain ranges of energy required to hold each additional shell attached” to the nuclei. Within such a range, energy can be absorbed or released in a smooth curve. If the energy falls too low or too high, discrete layers of material will be added to or subtracted from the action. Whenever a new layer is gained or lost, the entire internal resonance rate of action of the molecule must dramatically alter, with a new constant reached after a sudden transition period. During that transition period a certain amount of energy will be gained or lost by the molecular system, and that, energy will reveal itself in discontinuous bursts. These bursts appear at certain (discontinuous) energy levels of the molecule only because the material being affected has differentiated portions rather than because energy is itself basically discontinuous.

Radiant heat is a wave energy, and is part of the wave-energy spectrum. The difference between radiant heat and radiant light, is merely a difference of wave length and amount of energy per wave.

The sorce spectrum consists of pressure-density waves of all lengths. The distance between waves causes a difference of reaction of matter-units, according to the relation between the size of the unit and the length of the wave. Why?
If we have a series of waves of 1-inch length passing through a 2-foot thick unit, where that unit is moving through a room of ether, obviously the path of the unit will not vary because of the small waves in that etheric environment. But what if the 2-foot unit passes through a series of 3-foot density waves? And at a rate such that in relation to the rate of the waves, the unit is occasionally traveling through very definite and lasting density gradients? In that event, since the path of the unit will be affected by the density gradient of the traversed medium, the path will curve. A 2-mile wave passing through the room, with a 2-foot unit moving therein, would present so minute a density gradient per effective unit length as to be relatively unnoticeable by the unit. However, provided that the interval is greater than the diameter of the unit, it should follow that any wave length whatever should have some effect. Any shorter waves will be found within the diameter of the units so as to be ineffective on the whole unit. If radiant heat primarily affects molecules, the cause for this has to be the relation between the pattern of the molecule, the pattern of the wave length, and their relative speeds through each other. In brief, the size of the matter-units which will be primarily affected by a given secondary form of energy is a function of the wave form of that secondary energy.

When radiant heat waves enter a molar body, they pass through, or back and forth within, the continuous material of that molar body. But the continuity of that molar body is composed of many continuous units of matter, each of which possesses an inther pattern of varied densities and a series of patterned energies, through all of which an overall sorce prevails.

To a molecular member of a molar body a heat wave is a somewhat extrinsic energy. It will pass through that molecule and on through the rest of the molecules of the body. The point is that when heat energy begins to remain within the shells of the molecules it is no longer heat. Heat is the overall wave motions and resultant molecular motions in the molar body unit. When the energy is captured within individual molecular shells it has become a different secondary form of energy.

Energy intrinsic to the outer shells of molecules and atoms is known as “chemical energy.” The heat absorbed during changes of state of matter is therefore absorbed as chemical energy rather than as heat. It is liberated as chemical energy leaving the shells and converting back to heat again.

In the transfers of state it is seen that the chemical energy levels are discontinuous. Between these discontinuous chemical energy emissions, though, there is a continuous range of energy release and absorption possible, in the form of heat.
From which we may gather that the so-called discontinuity of energy is not real so much as it is apparent. Between the discontinuous emissions of electrical energy there must be continuous ranges of another form of energy. Between the discontinuous emissions of light quanta there must be continuous ranges of another energy change. The discontinuities are only for specific forms of energy, as boundaries between the continuous range of energy change within given levels of organization states. For instance, between certain ranges of matter-unit conditions of the unit levels 1, 2, and 3, the range of heat energy is continuous between discontinuous bursts of chemical energy, where the bursts of chemical energy are the energy of vaporization and liquification. These emissions of bursts of energy are quantum-like. It is to be expected from the generality of matter-unit anatomy, the physiological similarities of all actions except for the difference in size of the units and energies involved, that such quantum discontinuities of energy release and absorption will occur at many stages of continuous energy change, where each such quantum burst is the manifestation of a form of energy different from the one under continuous change.

![Diagram](image)

**Figure 31-1**

The following are some factors involved in the conversion of a solid molecule into a liquid one.
1. The shell-layers absorb more and more heat. More heat equals shorter wave length. Shorter wave length equals range of size such that a wave can be captured inside a shell.

2. Such a capture has converted the heat-exergy into chemical inergy.

3. When there is an increase of energy circulating within a shell-layer, then the source which that layer presents against its neighbors has decreased a la Venturi effects.

4. The excess source of a shell as compared to the nucleus was the cause of condensation of said nucleus and shells in the first place.

That level of secondary energy which primarily concerns molecules is called “heat.” Said heat can be a wave that moves through a continuous medium, or it can be conducted by a molar object which is a molecular contiguous. In such an object the heat waves pass back and forth through the molecules, thereby passing laterally through each one. As the molecules are their conducting medium, such waves cause and are molecular motions. The resulting actions can cause Brownian motion of immersed particles of appropriate sizes.

![Molecule, Atom, Heat Wave Diagram]

Figure 31-2.
We already know that the energy circulating within the nucleus and within the shells caused a decreased pressure between shells, and thereby allowed some to cause an increased density of the unit. An energy passing perpendicularly through the unit is passing across the intrinsic shell energies and may reverse the effect. If circulating energies cause decreased intershell pressure, then the extrinsic (heat) waves should cause increased intershell pressure. The density of the shells would then decrease as the molecules responded by expanding, or, if there were no extra room, the pressure would just increase against the walls of the container.

What about heat of vaporization and liquification, you should now ask. And what about the idea that heat, magnetism, etc., are generically similar, where the size of the component particles engaged is the main difference? Does not that imply that what is “gravity” to a planet is “magnetism” to a molar-unit is “heat” to a molecule is “electricity” within an atom is “light” to an electron is pressure and motion?
Chapter 32

Broad Analytical Approach
to the Mechanism of Gravity

After warily circling the subject at a safe distance, we are at last ready to begin the slowly sharpening inward spiral toward full understanding of the target: “Gravity.” It is time to move out of the molecular and atomic size and into a consideration of matter-unit Earth.

As the Earth unit moves around the sun, following the pre-existing orbit which is the boundary of the third planetary shell-layer of the sun, it displaces the ether. That displacement takes the form of concentric shells, or layers which remain ever centered upon the Earth-lax. Those density shells are in motion through the sun-oriented ether, while maintaining a configuration which is ever at rest relative to Earth. They are the standing-traveling waves previously discussed.

Any object flying through space and entering this shell system would find itself passing through a field of variable density. It would curve toward the side of greater resistance, hence toward Earth. It would be responding to the configurations of a zone filled with material of variable density, i.e., the “gravitational field.” The gravitational field, then, is the material and its density gradients. (If we introduced the shell-layer staggered density patterns into the relativity mathematics of “curved space-time,” and recognize that the degree of “curvature” of the gas lines really represents the density of the cad material, then we would have superimposed the essence of quantum theory onto relativity theory.)
Whenever an object is in motion through such a “gravitational field” its path will alter under the influence of that material field. Wave energy paths also will alter on traversing such a “curved” medium. Wave paths will curve in the direction of greater density, wherefore we might “predict” that starlight passing closely by the sun will be curved by the gravitational field of the sun, and that the amount of curvature will fall off (jerkily) with the distance from the sun since the density change of the field decreases (jerkily) with that distance.

But what about an object that is not moving through such a gravitational field but is instead temporarily suspended within it? Why should such an object begin to fall? Certainly the above field explanations no longer apply!

It is time to do two things. First, we must consider the absolute rate of motion of objects. The abram. And second, we must recognize that in addition to a gravitational field there must also be a gravitational force. There are two kinds of gravity!!!

This looks like a radical departure from Newtonian physics. At first glance it seems to deny the assertion that the law of gravity is universal. On closer inspection it will be recognized that this is not the case. Newton found that the law which describes the actions of the heavenly bodies is the same as that which applies to common earthly things. We now find that this statement holds good in principle, but that firstly, the form of the law has been amended into Einstein’s relativity equation, and that secondly, there must be at least two laws; one for the field (Einstein’s plus a necessary modification to include the quantum-type discontinuous variation of the density of the field), and one for the force. Possibly the modern tensor equation does include the requirements of both kinds of gravity, and just needs to be reinterpreted.

Let us now consider an object which moves through a space in which the average density of the cad is 5 densa per unit volume. Assume that the object has a volume equal to 1 unit, and moves so as to displace 10 unit-volumes per interval of time. It thus, has an abram of 50 densa. In its travels it finds itself entering the field of Earth, in which the cad density increases. In order to maintain its abram, the object would slow down relative to Earthlax. And since the density of the cad would be greater nearer to Earth, the object would also curve toward Earth.

Gravity one, of two. A curved path, but no acceleration.

Now consider that object as suspended above Earth’s tropopause where the cad density is the same 5 densa. The object is at rest, and has an abram of either 5 or 0 (depending on whether we allow the at-rest volume displacement of the object to be considered or not). Consider this object with reference to the ether; an ether which is at rest to the sun-lax and through which the density shells of Earth are moving. The abram of the object is now finally recognized as being 5 densa times
the speed of Earth per time interval, rather than the zero which was only a relative rate of motion after all.

Our object thus starts with an abram of, say, 50. But if it were to change its position relative to Earth (as it would if it stopped moving “at rest” to the standing-traveling waves) it would enter a medium of density different than 5 and its abram would vary. In order to maintain its abram, then, the object must at least remain at rest to the Earth, hence in motion through the ether in directions governed by the changing position of Earth. This it does. But in addition, it falls. Why should that object begin to fall? What if it really were absolutely at rest to Earth, thus within the atmosphere rather than traveling through a sun-oriented ether with Earth-oriented density configurations?

The nature of the gravitational field around the object has no role over the direction the object will continue to move if that object were not moving to begin with. And yet, in a way it does.

Refer to our many wave discussions and the inx-rinx energy matrix considerations of Chapter 25 (page 179) and later on. Remember that there are energy waves moving to and from the center of each matter-unit. Remember that these waves weaken as they disperse on leaving, and strengthen as they reconverge on returning. Remember also that whatever material happens to be present at a given place is the carrier of whatever wave energies happen to be traversing that spot. Remember, too, that the density of the conducting medium governs the patterns of traversing energies and that the amount of such energies governs the densities of the medium.

Now graft these concepts upon this one: Picture the cad. In it, we find a system of shells at rest around the planet, through which energies circulate around and around forever moving perpendicularly to and from the center. (Some relativity involved here.) You will see that the outgoing and the incoming waves will forever cross one another to set up a series of standing density waves through the cad. You will see that, in the abstract, those waves will exist at any given place regardless of the type of material or object which happens to be there. In short, the force pattern exists somewhat independently of the materials present, and forms a geometrical framework centered upon the center of Earth. (The independent existence of such a force matrix is limited by the necessity that there be some material or other present everywhere.)

In your mental sketch you now have a spinning central core permeated and surrounded by a matrix of lines of force, where the strength of that matrix increases with the approach to the center, and the geometry of that matrix is centered upon the core no matter what objects may be present within the cad.

But since that standing matrix is formed by the overlap of wave energies, and since wave energies condense upon entering a dense medium, it follows that the
force matrix will be denser at a given spot when a denser material is present at that spot than it would be when a less dense material was there.

In Figure 32-1 a body is present. Within that body the matrix is denser than outside the body. After the body leaves that spot the matrix will still be present, but it will have returned to the less dense condition. Wherever the body moves in the matrix, it will continue to establish an increased density matrix within itself even though it is at an ever changing portion of the matrix. (The lines are lines of force, and represent waves of pressure moving to and from Earth. They are shown criss-crossing each other only within the body, but would also cross outside the body and thereby set up a looser matrix outside.)

Return for a moment to a consideration of the motion of Earth through the outside ether. Remember the standing-traveling waves. The strength of those waves and the amount of ether involved will depend on the absolute speed of earth and the density of the ether. The faster Earth’s abram, the stronger its standing-traveling wave shells and the more ether under the direct control of Earth. When overall gravity waves enter such a shell system they will be condensed in response to the local density waves around Earth. The same holds for gravity waves entering molar objects, molecules, atoms, and atomic nuclei. Whenever their abram increased, the density immediately around would alter, and so would the gravity matrix strength.

So what? What effect does this gravity force matrix exert, provided that there is such a thing?

Simple. Given: A body hanging freely at rest in the atmosphere. Given that a force matrix exists within the body. Given that the body is itself composed of numerous contiguous particles, in each of which circulating energies are intrinsically present. And given that the configuration of these particles is as dependent on the intrinsic energy pattern as that pattern is dependent on the
density configuration. It follows that whenever there is an overriding density increase with the approach to a given side of the body, the path of the intrinsic waves of the particles will alter accordingly. And it also follows that when the energy pattern moves, the density pattern of the material of the particle will follow and then lead and then follow and then etc., etc. And when both the material and the energy move in a given direction, why what remains behind?

In response to the existence of the gravity matrix within itself, the object will always tend to move in the direction of the center of that matrix. By its own bootstraps, so to speak.

You may or may not realize that in these discussions we have provided a broad explanation of the mechanism of the phenomena called “gravity.” Let’s do it again.

There is first of all the force matrix of standing-traveling density waves, the increasing density gradient with the approach to the center of the matter-unit Earth, and the gradient set up by the permanently overlapping waves which travel perpendicularly to and from the center of the unit as they follow the “curvatures,” the density relations, between matter-unit boundaries.

There is then the presence of that matrix in the entire lax of matter-unit Earth regardless of what other component units happen to be present.

There is then the fact that a force-matrix will vary in actions and densities with the variation in the density of its conducting media.

There is then the fact of the actions of the intrinsic energy of the smaller unit, and the fact that it is the presence of that density-steered intrinsic energy that causes the continuation of the matter-configuration which steers the energy.

All of which add up to the fact that an overriding energy density gradient, the intensity of which in any given unit is a function of the intrinsic density of that unit, will cause deviations of the intrinsic energy pattern (hence of the matter-configuration itself) in the direction of the gravitational body.

For instance: We start with a stone existing free at 1 mile of altitude. It is at rest to earth and the air. There is a force matrix that existed in the gas space occupied by that stone before the stone even got there, and it still exists in that space now that the stone is also there.

The force matrix is now carried by the matter of which the stone is made. It happens that the matter of the stone is far denser than was that of the air that had previously carried the force pattern in that gas space. Since the actions of wave motions vary according to the density of their conducting medium, and since they converge upon entering denser regions, it follows that there will be a tighter, stronger matrix within the stone than there was in the air.

The structure and strength of the force matrix will vary according to the density of its conducting medium.
Now we must take a closer look at the stone itself. What is it made of? The stone is made of matter, where that matter is arranged in certain patterns by virtue of the moving waves within it. Those moving waves maintain molecular and/or atomic matter-units as contiguous parts of the continuous stone. What is the pattern of the waves in the little units, and why? The waves spin around in tiny spherical rings within each unit, because of the variations of dinsity of the matter of those units, where the dinsity variations are caused by the very waves that move.

But the force matrix belonging to the earth-unit is also in the matter of the stone. That matrix actually is a set of variations of pressure and dinsity of the material of the stone, hence of the little units.

The energy of each component part of the stone travels in a path” that is guided by the dinsities, the force matrix is a variation of those dinsities, and the matrix grows stronger (denser) as it approaches Earth!

There is a moving dinsity wave that causes the existence of the nucleus of each atom of the stone. That wave is steered by dinsities. Where the force matrix of Earth is carried by the stone, it will have a strength dependent upon the dinsity (mass) of the stone. The basic strength of the “gravity” matrix in an object depends upon the mass of the gravitational source, but its intensity in any given object is a function of the dinsity of that object itself.

The gravity matrix is actually a matter-configuration in the stone. There are internally moving waves within each atomic nucleus, each electron shell, and every part of the unit-stone. Those waves will always move toward a zone of increased density. The gravity matrix condenses and strengthens as the circumference of its Earth-oriented circle decreases. It is denser with every unit distance closer to Earth. Even in any component part of any object.

It follows that there will be a net deviation in the path of the structural waves of every part of an object, where there is an overriding matrix gradient. But those structural waves are actually moving matter configurations themselves! Those internal waves are made out of the matter of the object itself! When they show a net deviation toward Earth, or center of gravity, so has the entire object. The whole stone, and every part of it, is a matter of configuration. When the moving waves within it have all moved in a given direction, then so has the stone—by its own bootstraps.

The size, hence strength, of the local gravity matrix will alter as does the dinsity of its conducting medium. But the dinsity of that local area depended on the strengths of its own internal energies to start with. It follows that where the overall gravity forcefield is of a given strength, the local gravity matrix within any given object will vary in strength according to the mass of the given object. Whereupon it also follows that all objects will respond to a gravitational force-
field in the same net quantitative manner, regardless of the mass, because they will alter the background force matrix strength according to that individual mass. Compensations in everything. Bootstraps within bootstraps.

I

INERTIA AND GRAVITY

There are several consequences to be expected of this explanation. Firstly, since all matter units have similar configurational patterns and energies, any unit will have a “gravitational” matrix of its own, centered upon itself. Wherefore all objects should attract each other.

Secondly, since the matrix of any given object is at rest to that object, it must be traveling at whatever speed the object travels, hence must always geometrically return to the point the object is going to reach in the time it takes the matrix to travel out and back. This means that whenever an object changes its absolute speed or its direction it will depart from the position its own matrix is centered upon. This means that an object would always be attracted to the point it should have reached had its speed and direction not been altered. This is known as “inertia.”

We can thus define inertia as being the tendency for any matter-unit to remain at the center of its own force matrix. Gravity would be the tendency of any matter-unit to come to the center of the force matrix of some other matter-unit.

These are explanations as well as definitions of inertia and gravity. A study of the explanations will demonstrate to you that the causes of inertial and gravitational effects are basically the same thing, where the difference lies in the ownership of the force matrix. It also leads you to understand that the inertial force matrix of a given unit will itself be changed in the presence of an overriding, gravitational pressure-density-wave force matrix.

Absolutes Again

Now that we know the general cause and method of inertia, and its relation to gravity, we should at last look for the complicating role inertia plays in any attempt to create an adequate definition of absolute rest and absolute motion.
You must see that these force matrix systems are a trifle abstract, in that they are existent patterns often superimposed upon other existent patterns upon others, etc. They have a sort of abstract identity independent of their sources. (In fact, it is quite probable that instead of maintaining multiple overlapping identities, these force patterns may merge and combine to produce resultant patterns with a new identity, as when the outer shells of two atoms merge and reform into new shells surrounding the remains of both original atoms, thereby establishing the configuration of an entirely new unit.)

You must see that once the force waves have left the core of a unit, their motions become independent of that core in that they react only to the conditions present wherever they happen to have reached. Once instigated, then, they will follow their perpendicular-straight-line-curves so as to return to a point directly where the core should have been if it had not changed abram and direction. Wherefore (just in case you understood this), a thing is in a condition of absolute rest when it remains at rest to both its own and the overriding force matrix of its parent matter-unit. A thing is never at rest, therefore, if it is being accelerated or decelerated, even though the rational choice of reference body be accelerated or decelerated so as to keep that thing “relatively at rest.”

To know the absolutes of any given body, then, we must know the configurational relations of all the matter-units from the next higher level on. These are susceptible to measurement, hence can be known. Right up to, but not including, the infinite “unit,” the cosmos.

A matter-unit is a self-perpetuating matter-energy configuration which possesses its own inergy and inther. The inergy and inther of a matter-unit always move with that unit, since they are that unit. At the same time, remember, the given unit can and does carry its local part of the exergy of that zone, and to the extent that such energies alter the configurational pattern of the matter-unit that local portion of ether is “etheric.” Shall we do that again?

O. K. You will understand this better if you place two objects next to each other before you, and continually refer the words to those objects as you read. Given: A lax. In that lax, a portion of ether begins to spin (for any reason). The spinning portion is now inther, and its environmental ether is exther. A constant sorce had pervaded the lax prior to the spin. With the advent of that spinning motion the Venturi imbalance of sorce is introduced. The inther of the core (nucleus) is condensed, and its rate of spin increases to maintain its newly specifiable inergy. (Add to the picture the entire dinsity-gradient, vibrational-wave system understanding taken from our previous sections.) Under the influence of the sorce imbalance, the exther flows toward the core, thereby increasing in dinsity. The nucleus shrinks, condenses, and spins faster. The increased rate of spin reintroduces the sorce imbalance and more exther flows from the cad toward the inther of the core. But the nuclear inther is a fixed
quantity. It cannot add more ether, since it has no such reserves as does its infinite outside exther. So the nucleus condenses, condenses, condenses. There comes a time when the dinsity of the inther has become large, and ever larger increments of exergy must be applied against it to further compress it. When the inther becomes sufficiently dinse, its own counter-sorce pressure will increase appreciably faster than that of the less dense exther, per amount of volumetric change. The sorce imbalance will thus finally be eliminated when the dinsity of the inther is such that the amount of pressure which must be added to attain another unit volume compression is exactly equal to the sorce-differential-imbalance plus the amount of pressure required to compress the less dense exther that same unit-volume, and end up with a constant cad sorce value. The results of these (variations of dinsity of inther, and proportionate increases of dinsity of the adjacent exther, with increases of inergy and local exergy, all of such amounts as to yield a constant linear sorce throughout the entire gax) are the formation of a configurational pattern, i.e., the matter-unit system.

Our lax, now, is attached to the nucleus and spins with it. To that lax, the material pattern of the nucleus and its surrounding shells is at rest. Further, the matter and energy of that unit are inther and inergy. Given that many such units exist within a given cad, and that there be set up a cad-oriented lax, the smaller laxi will all be spinning within the cad, as will some of their inther and inergy. Given that that cad is within a larger matter unit, though, the inergy pattern of the larger unit will pervade the cad and everything in it. Given for example:

1. You, a physical molar unit composed of touching molecules possessed of given inergies and inthers, all patterned as to dinsity and resultant directions of inergies. Each such unit is a circle of configurational cause and effect, i.e., the inergy remains in the unit-gax because of the dinsity gradient, which gradient is itself a result of the local inergy-exergy Venturi effect.

2. The room you’re in, which is a part of matter-unit “Earth”, as are you and your component structural units.

3. The fact that matter-unit-Earth has its own inergy-inther pattern, and that the pattern exists at every part of the lax of Earth, regardless of the local patterns of whatever objects and subordinate units happen to be present at that Earth-lax-zone.

It follows that: What is inergy to the Earth-unit is exergy to you. It nevertheless permeates you and every component part of you. What is inther to Earth is you and your extheric cad.

You will now understand that every inergy field of a given matter-unit is centered upon that unit, and sets up a dinsity gradient (in its, inther) that also is centered upon that unit. Such an inergy, inther field of a given unit is an exergy, extheric pattern when it permeates any other matter-unit’s self-oriented inther-inergy configuration.
That exergy field will manifest itself as variations of local dinsity of the inther of a given unit. Such variations of intheric dinsity must then cause local alterations in the path of the inergy of that unit. Naturally, a variation of the path of inergy will alter the circle of cause and effect whereby the inergy-inther maintain their configurational equilibrium. Hence, the altered path of the inergy, in response to the slight variation of intheric dinsity created by the exergy field, will cause the ether to also alter its position and path.

So! The extheric-exergy configuration from matter unit 1 will permeate unit 2. This will shift unit 2’s intheric pattern off from the center of unit 2’s gax. That shift will alter the path of unit 2’s inergy, in such a way as to move toward unit 1. The inther of, unit 2 will then move to the new position it must reach to be back in equilibrium with its own inergy. When the inther and inergy of unit 2 have thus moved, only the lax is left, no longer at the center of its own unit. Poor lax. It isn’t real, you know. When the inther and inergy of unit 2 have moved in the direction of unit 1, unit 2 has just moved. “Gravity.”

Gravity is a warp in the space-time path of inergy-inther in response to the dinsity change in the matter-unit gax, caused by the exergy-exther configuration of some other unit. Gravity is the effect of the lax of any unit 2 on the gax of a unit 1.

“Gravity,” then, is the reaction of the inergy and inther of any matter-unit A to the inergy field of any unit B, when unit B’s inergy permeates unit A as exergy, and makes an exther pattern in unit A’s inther.

“Inertia,” then, is the reaction of the unit’s inther-inergy to its own self-centered gax metric, to which it is ever at rest. When the gax happens to be moving with respect to any larger lax, or max, the inergy and inther of the matter-unit which owns that gax must remain at rest to it.

“Inertia” is the reaction of a unit’s inther and inergy to its own pattern, while “gravity” is the reaction of a unit’s inther and inergy to some superimposed exergy, extheric pattern.
We have dipped low. Now we shall curve away, for a moment, only to return at a sharper angle. The last few chapters provided a broad explanation of the effect called “gravity.” But it left some loose ends. With respect to the source spectrum of actions and reactions we have insisted that to fully understand any part of it is to understand all of it. Gravity is only a part of that spectrum.

For the next few chapters we are going to scrutinize every qualitative aspect of the actions of matter and energy, so that by the final analysis we completely understand our subject.

Imagine a spinning globe in space as in Figure 33-1. The ether filling that space is under a 10-pound pressure. At the surface of the globe the effective pressure has been reduced to 5 pounds by the spin. How can that 5-pound differential be equalized?

![Figure 33-1](image-url)
Consider the imaginary circles drawn concentrically around Globe B. Can any of the pressure decrease on a given line be compensated by drawing upon the finite amount of inther on that line? No. Any inther that began to move around line 1 toward the decreased pressure at points a, b, or c would immediately have to return. So for movements on lines 2 or 3. But ether can move from line 3 to 2, and 2 to 1. There is always more ether outside of every such line to move into the zone under the ubiquitous and relatively constant sorce, so as to equalize that local imbalance.

Further consideration of this concept leads to some interesting conclusions about the importance of relation and direction. When an energy (A) moves radially away from a nucleus, its passage causes a Venturi decrease of pressure perpendicularly to its path and a consequent sorce imbalance parallel to the surface of the nucleus, along the lines 1, 2, or 3 of inther. A finite supply of inther means a limited material response to the imbalance, hence a “force field.” If and when the moving energy (A) curves upon entering a medium of uneven dinsity, then the force field accompanying it will find itself drawing upon ether, as shown in Figure 33-2.

![Figure 33-2.](image)
There is an infinite amount of exther available to compensate for the sorce imbalance (force field) by flowing into the zone so as to equalize the sorce.

The degree of curvature of the path of the moving energy will depend upon the absolute dinsity and the dinsity gradient of the traversed field in relation to the abram of whatever moves. Since the dinsity decreases with the square of the distance from the nucleus, the amount of curvature of the departing energy will vary accordingly. Hence, there will be twice as much distance required, successively for each induced energy to curve sufficiently to be parallel to the nuclear surface.

Double arrows 10, 20, 30, 40, 50, and 60 represent inflow of material in response to an outgoing sorce imbalance induced perpendicularly from line 3, by the first outgoing energy A. It is seen that from 3 to 4 is twice the distance of 2 to 3.

Galileo demonstrated that “Theorem 11, Proposition 11. The spaces described by a body falling from rest with a uniformly accelerated motion are to each other as the squares of the time intervals employed in traversing these distances. “He drew the corollary that if a body falls from rest with a uniformly accelerated motion, the spaces $S_1$, $S_2$, $S_3$, . . . which are traversed in equal periods of time “will bear to one another the same ratio as the series of odd numbers, 1, 3, 5, 7,....” He then pointed out that this series of odd numbers derives from the fact that the distances gone in the first period, the first two periods, the first three periods, etc., are as the squares 1, 4, 9, 16, 25. Here are those familiar squares of the natural numbers again.

In our curving lines of Figure 33-2 we do not have any accelerations. We have only a geometrically decreasing density. In terms of a lax, however, it would take steadily longer intervals for the arrow point to traverse equal densa of ether in such a field. Accordingly, for a point to maintain a constant abram in a cad of square-of-the-distance dinsity decrease, the gax-equal distance of curvature into parallellism with the core-surface would follow the lax square of the natural number proportions so common to all matter-units.

This demonstrates the physical cause of shell layer formation, plus the reason why the boundaries are always slightly closer to the core than a pure geometrical sequence would require. That reason is that the influx of exther (inx) is overdone, a bit, to compensate for the negative inx which draws from the finite amount of inther of the core.

The patterns and results of wave or particle energies that originate in, move in or pass through a matter unit are:

1. A venturi imbalance is set up perpendicularly to their path.
2. On that aspect of the path that is perpendicular to the core there will be an influx of exther and/or an unsatisfied outward tension (-inx) in the inther, as in lines D.
3. On the aspect of the path that is parallel to the core, the imbalance will set up unsatisfiable tensions around the core.

The influx of exther in response to a motion parallel to the core of a unit is “inx.” “Inx” means more than just influx, though. It includes in its scope of meaning the exther, the direction of the causative agent, the core in question, and the source imbalance being sated by that influx. The non-availability of inther to satisfy a line D directed imbalance can be compensated by an excessive exther influx. Meanwhile, the line D directed effect is a “negative inx.” The same effects directed round the core, along the lines 1, 2, 3, etc., represent a roundflow, a sort of round inx, or, “rinx.” Rinx has no negative direction, since it forms a circle with no start or end. Inx has polarity, in that the ether can flow either in or out from the core. Source imbalances similarly can be inxical or rinxical, in direction and effect. A rinx effect generally causes a source imbalance around the core, while an inx effect generally causes an increased density around that core. Of course, many conditions can exist whereby the inx imbalance cannot draw exther, because the exther of the cad is more strongly drawn and held elsewhere. In that event, the inx and rinx effects will be similar, i.e., an unslaked imbalance. These source and density gradients are the source of all force field reactions.

In Figure 33-2 it can be seen that the inx effect is strongest where the line A has curved to a parallel with the core. It is also seen that the rinx effects B gradually merge into inxes. The inx-rinx field, then, is a resultant, a mixture, in which the amount of either is greatest when that of the other is least. (Does anyone here know Maxwell’s electromagnetic field equations?)

An “electromagnetic field” is an inx-rinx source imbalance.

If “electricity” is thought to be the flow of electrons through a conducting wire, then such electricity would be as particulate as are electrons. In that event, since an “electric field” is continuous and decreases in intensity with the square of the distance from the source, said field could not be the same thing as electricity. A continuous field cannot be made of discontinuous electrons. Furthermore, if an electric current moves at light speed, and at that speed all particles have infinite mass and no length, then not even electricity can consist of an electron flow. The electrons would have to be infinitely heavy. Nevertheless, if “electricity” refers to the actions of electrons, then electricity is not the same “electric” as is the field. Similarly, if magnets are thought to be made of small magnets (molecules), and those are particles, then magnetism is not those particles at all. It is the continuous force field that extends through, around, and outside of those particles. Magnetism
seems to be a rinxical effect. Electricity shows a plus or minus effect. Figure 33-2 shows how the rinxical effect of magnetism (rinx) causes zones of inx-curved exther condensation, or thick shell-layers of variable-rate-of-change dinsity. “Lines of force.” Shell-layer boundaries of matter-units. Electron orbital “probability clouds.” An electromagnetic field.

All the same things, but at different size levels and wave lengths. Ultimate physical reality is not “electricity” nor “magnetism.” Not an “electromagnetic spectrum.” Not “heat, light, gravity, quanta,” nor atomicities. It is an inx-rinx sorce gradient causing variable dinsity inther-exther flow patterns and/or tensions, with specific resulting reactions by matter-units or sub-units of appropriate size, shape and inther-inergy pattern. We call those various action reactions by the names “heat,” “gravity,” etc.

Some might hold that all we have accomplished is to substitute the words inx and rinx and sorce imbalance for the words “electromagnetic field.” They might argue that there is no greater merit in calling a rose a rose than in calling it any other sound. Such an argument is doubly refutable. First, in present theory “electric” and “magnetic” are totally non-understood. An “electromagnetic field” does denote a known item, but the inner mechanisms of that known effect are complete mysteries. Our “inx-rinx sorce imbalance” has been meticulously and intricately explained herein. Second, the inx-rinx sorce imbalance is not just an electromagnetic field. It is the entire sorce spectrum. It includes in its mechanics such effects as “gravity,” “nuclear force,” and “chemical valence bonds.” It leads to a complete exposition of what, why, and how is a quantum, and an end to the indeterminacies of existing physics. It is therefore very much more than the heat, electricity, magnetism, x-rays, radio waves and light that make up an “electromagnetic spectrum.” So, while the electromagnetic field is an inx-rinx sorce imbalance, the entire range of inx-rinx sorce imbalances far exceed that of the electromagnetic portion.

In the discussions concerning the nature of inx and rinx we considered the effects of rotating cores. Several details may now be added.

1. A spinning core necessarily has a polarity, since it must spin on an axis. Accordingly, the inx-rinx effect will be variable at different places around that spinning globe with its circulating inergy nodes. The rinx effect, drawing equilaterally along spherical planes concentrically parallel to the core-surface,
will be far more constant than will the inx (-inx) effect, which will depend
directly on the rate of surface motion, hence on the “latitude”.

2. The inx-rinx effect is not limited to spinning cores. It exists around any line
of flight of any moving anything. Accordingly, every inx-response of exther will
create an inx effect perpendicularly to itself, wherefore inx and rinx each is
perpendicular to itself.

3. Consider a flying arrow, for instance. At a given max space-time position of
the arrow there will be a decreased inx pressure perpendicularly to the arrow and
a rinx imbalance circumferentially around that arrow. In response, exther will
begin to flow toward the arrow to satisfy sorce. The ether in the rinx direction
cannot satisfy the imbalance because of the geometry of rinx. When the arrow
moves on to the next space-time interval, the inx-rinx effect no longer is present
at position 1. The ether will go back to its previous position. Although the arrow
moves in a straight line, the effects it creates accompany it as a transverse wave
from a certain abstract point of view.

4. Since inx and rinx are perpendicular to themselves as well as to each other,
the only real difference between them is the geometrical relation to the cause.
Depending on that relation, there will be an inx influx of ether and/or a rinx sorce
gradient.

5. There will therefore be zones of gradations of dinsity of ether, with
perpendicularly superimposed gradations of tension, throughout every cad.
Chapter 34

Analysis Sharpens

We must now discover what it is that causes the inxing and rinxing—what inxes and rinxes, how it does it, whether it is a wave, and if so a wave of what, and how it propagates. We must specify the effects of inx and rinx upon matter-units and sub-units. We must explain the total mechanism of creation, transmission, absorption and affects of the inx-rinx sorce spectrum from light, to gravity, to nuclear force, to re-sorce.

We must use a stronger lens, in our analysis. Let’s focus down upon the electromagnetic portion of the overall sorce-spectrum.

The diagrams below demonstrate a number of errors of present theory.
1. Inx does have direction, as indicated by the arrowheads. If the core represents an excess pressure compared to sorce, there will be an outward flux. If the core represents a negative pressure, there would be an influx. Accordingly, there are several reasons why there can be a plus or minus inx.
2. But, these inx “electric field” arrows exist three-dimensionally around the “proton,” hence also exist on the plane represented by the rinx directed lines, purportedly representing the magnetic field.
3. In the diagram of a “magnetic monopole,” its inx and rinx directed lines are identical to those around the proton, hence could not represent any magnetic versus electric difference.
4. These brief considerations are sufficient to demonstrate beyond question that the diagram of an “electromagnetic wave” is impossible. The “electric” waves form a three-dimensional series of globules that must coexist upon the
similarly patterned “magnetic” globules at every point. The two components therefore could not possibly move perpendicularly to each other in the manner represented by the diagram because the diagrams state that they are three dimensional.

In existing scientific thought it is held that point 1 is an electron, and the solid arrows radiating out from it are the electric field. It is held that point 2 is a magnetic monopole, and the broken arrows are the magnetic field. The circling arrows next door represent the magnetic and electric fields, respectively. (In our concepts, we show them as inx (electric) and rinx (magnetic).) The lower diagram represents the grafting of the two concepts upon one another to represent existing concepts of the electromagnetic field, and an electromagnetic wave propagating through it. Note that the vertical plane represents existing concepts of the electric component, while the horizontal plane represents the magnetic component. Since both electric and magnetic fields are thought to radiate out perpendicularly to the “wave,” there is nothing that corresponds to our rinx field, in existing theory.

Figure 34-1.
5. The diagram shows something else that is left out of the existing theoretical considerations. A long black arrow represents the direction of propagation of the electromagnetic effect. In the theory, that arrow represents an abstraction. In reality, there must be some real item that moves along the path of the arrow, to give rise to the inx-rinx effect by its passage! In other words, the transverse wave does not propagate at all, but is a secondary effect that accompanies whatever it is that does propagate.

6. In the diagrams, the rinx effect also is represented by directed arrows. In it, the direction of the arrows seems to be the only difference between the magnetic and electric effects. But rinx is actually the pressure differential that cannot be satisfied from a rinx-direction, and which therefore exists all around any point on the rinx-spherical plane. The rotation of such a spherical plane cannot change the effect of rinx, nor does it change the fact that rinx creates the magnetic component and inx the electric part of an electromagnetic effect. Wherefore, if there were such a thing as a magnetic monopole, all it would be is a pure rinx field around a core which has no inx-caused dinsity gradient. A neutron or neutrino. In either event, it is evident that there is a plus and minus inx, but that depending on whether its cause is translationally or rotationally moving the rinx effect is as cylindrical or spherical planes, rather than in a directional monopole.

From all of these weighty arguments we draw the conclusion that the rinx circles represent the magnetic field, and the inx-arrows the electric field. In the last diagram, the sets of arrows of both perpendicular planes represent the electric component of the electromagnetic field. The magnetic component was left out! We added it in.

Rinx is the answer. What component can coexist at every point around the line of flight of the causative agent, yet be perpendicular to the inx-lines that fill the cad? Yes. The concentric directions of the magnetic component (rinx) are coexistent yet perpendicular the radiating electric component (inx). The inx-rinx effect ebbs and flows as the arrow flies past. The ebb and flow of the traversed medium’s inther and sorce-equilibrium follows the abstract path of a transverse wave.

Around a translationally moving cause, the inx-rinx effect cannot be separated into a pure inx or pure rinx. Each automatically creates the other, as we previously saw. The only difference between them that can persist is the dinsity gradient that can satisfy a stationary inx, but not a rinx, and the sorce-gradient that will persist on a stationary rinx but not an inx. These require a rotating core.

Of course, a rotating core would have an axis, hence polarity. Even a flying-arrow-sort-of-cause might also rotate on its own axis so as to set up the Figure 33-2, lines of force, with inx-rinx curvatures in the square-of-the-distance-gradient of the environment. The rotating source might be a spherical core, a node, a nucleus. That spinning spheroid might also be in translational motion, hence could create a
direction of curvature of its inx-rinx Figure 33-2 effects. The direction of such curvature would be the same as the direction of spin, since the spinning gax-inx lines would automatically be entering the larger lax’s ether at an oblique angle slanted in the spin-direction. Therefore, the diagrams of differently directed spin of the rinx lines would represent differently directed spins of the cores, rather than magnetism-versus electricity. Since the larger lax is always a part of a larger matter-unit, and since that unit always has its own spin (or, at least, its own independently different motion than that of its exther), the relative direction of the spin of the node must have important physical consequences. The Coriolanus effect might set up a totally overriding polarity to all possible spins such that just as whirlpools in a given hemisphere all rotate in the same direction, all spinning nuclei of inx-rinx effects would assume certain allowable attitudes and consequent sizes with respect to their parent unit.

We have almost slipped into a quantitative procedure of considering the amount that happens rather than how, what, and why. Let us leave such accounts to those qualified, and instead pursue understanding.

Q. What is an electromagnetic field?
A. It is an inx-rinx sorce imbalance of a certain pattern and speed.
Q. What is it that inxes and rinxes?
A. That which inxes and rinxes is the sorce-imbalance Venturi effect, and the ether motions that start to satisfy it.
Q. What is a “sorce imbalance?”
A. A sorce imbalance is a pressure differential.
Q. What is the effect of a pressure differential?
A. A pressure differential of sorce causes a dinsity gradient.
Q. What is the effect of a dinsity gradient?
A. A dinsity gradient, once initiated, must propagate itself because once initiated, it is a pressure differential.

Here is the first circle-thought I ever met that is neither part of the long, long spiral nor even a circle. It is explained at all ends, and is actually the finishing curve of this entire work since the paths it leads to, in either direction, are all those we traveled to reach it. This “circle thought” represents “Finished” for this work. Let us apply it a bit to show you how.
Chapter 35

What Is “Light?”

In the previous chapter we saw that the sorce-spectrum is a moving dinsity gradient, an inx-rinx sorce-imbalance. We saw that while all electromagnetic fields are such an effect, not all of the inx-rinx-sorce-imbalances are electromagnetic. We had analyzed down, is all. Now look a little closer. Enlarge the image, and narrow the field of view. Consider that portion of the em spectrum called “light.”

Light is said to be an electromagnetic wave. An electromagnetic wave is a moving portion of an electromagnetic field. An electromagnetic field is an inx-rinx sorce imbalance. An inx-rinx-sorce-imbalance is a pressure differential with a dinsity gradient. Light, then, is a traveling sorce-dinsity-gradient. Is it a wave? Good question.

In Chapter 34 it was shown that something other than the electromagnetic waveform had to propagate through the cad, even though transverse waves can accompany such a moving cause. How does what move perpendicularly to the direction what of the conducting medium vibrates? We must substitute for the two remaining “what’s.”

Water waves are transverse, sound waves longitudinal. Why are water waves transverse, and what causes them to assume a wave form at all? The pressure of the wind is the cause of water waves, and it is that pressure which is transmitted through the water. The direction of transmission is horizontal even though the portions of the water move vertically to provide the transverse waveform. It is the successive impulses of pressure that are transmitted in lateral pulses of energy.
accompanied by transverse waves of water. What can be the “wind” that provides the impulse with respect to light?

According to all our considerations, the change of thickness of whole circum-nuclear shells represents a type of change-of-state of an atom with a specific amount of energy altered. The energy change consists of a series of pulses of inx-rinx sorce imbalance transmissions. Such beats issue successively, and in the form of expanding spheres around the issuing atom. Miniature expanding van Allan belts, issuing from the atom in a large, but specific number of vibrations, and traveling out until absorbed. This is the “wind” that conjures up the light impulses. The briefest consideration of this kind of physical event is enough to convince us that these beats can represent only a longitudinal wave system, rather than a transverse, curved string type of wave.

Classical physics erred not only in considering the ether absolute and stationary, but also in requiring it to be an “elastic-solid” so that it could transmit what were wrongly postulated as “transverse waves” of light. ¹ We insist, however, that rather than dismiss the ether we admit that the ether is the highly compressible, everywhere moving or movable material medium out of which all material objects such as atoms, molecules, and Venus di Milo are made.

Now a transverse wave might have been a sort of coiled spring something which could travel through a true void as some sort of undefined “energy” packet. But a longitudinal “wave” is not the same sort of thing at all. It is not that kind of a self-sufficient wave, but rather a series of consecutive compressions. It would be perfectly possible to have only one such compression pulse travel through material. For example, when the first of ten touching billiard balls is struck, the impulse travels through nine of them, and the tenth moves off. No wave length here. Just an inx-rinx pressure differential. A moving pressure energy, conducted

¹ Editors Note: That which imparts the transverse component to the wave-systems are the traveling wave-patterns propagating through the frictionless and non-dissipative fluid medium of matter. These patterns faithfully reproduce the four-dimensional structure of the source of the wave-systems. The waves themselves are not transverse but the patterns ‘encoded’ in the wave-systems do possess a transverse component.

The following is from a 1997 article in Science Daily (www.sciencedaily.com) in which physicists from Northwestern University had shown that a superfluid medium can transmit transverse wave patterns. “The finding, reported in the July 29 issue of the journal Nature, is the first demonstration in a liquid of the 'acoustic Faraday effect,' a response of sound waves to a magnetic field that is exactly analogous to the response of light waves to a magnetic field first observed in 1845 by British scientist Michael Faraday. The acoustic effect provides conclusive proof of the existence of transverse sound waves -- which are characteristic of solids but not of liquids -- in superfluid helium-3.”
by a contiguous material. The thing that finally moves off into space is the last matter-unit, the billiard ball. But such compression waves could never traverse a real vacuum.

We can now replace the “whats” of page 242. How does the inx-rinx-sorce-imbalance move perpendicularly to the direction in which reacting matter-units of the conducting medium vibrate? Answer: It is the compression pulses that move as longitudinal waves, conducted by a material ether. Hit a spinning top, or a gyroscope, and it bounces off at right angles to the blow! Just like the matter-units bounce off a traversing inx-rinx-sorce-imbalance so as to create a transverse accompanying wave train behind the longitudinal fronts, when proper sized matter-units are present. Or even like the inx-rinx effect everywhere perpendicular to everything moving, including itself, so as to show a transverse secondary pattern.

If we now want to consider the actions of the primary light energy, rather than of the transverse wave sequences that accompany its passage through certain forms and states of its conducting medium, then we should talk in terms of pulses of energy, where the energy is sorce-in-motion. The distance between pulses is what used to be called “wave length.” We should no longer confuse it with the wave lengths of the transverse accompaniment secondary effects. Instead, we can call the distance between pulses a “line interval.” The line interval, or “interval” of light, then, may be defined as the average max-unit distance between the centers of consecutive pulses.

Argument Against the Existing Transverse Wave-Theory of Light

In a continuous-spectrum field the pulses must overlap. In a band or line spectrum type field there are sorce-normal spaces between compression pulses.

It is a singular fact that the spectrum of a solid or liquid is continuous, while that of a gas is discontinuous. This means that the “waves” from a solid or liquid would have to be of every light-wave length, coexisting simultaneously, while for a gas there are only certain specific wave lengths.

Why must every light-wave length coexist simultaneously in light that gives a continuous spectrum? Well, if it is possible to produce every range of color and hue demonstrated by a continuous color-change spectrum, and each color is a different wave length, then if the prism merely broke the initiating light into its components so as to demonstrate this infinite range of colors, said infinite range of waves had to coexist in the initial light.
Return to the “electromagnetic wave” diagram of page 239. Remember that the arrows in both perpendicular planes are in x, electro-arrows. Allow the longest arrow to represent the maximum amplitude of the above light beam. Now draw an infinite number of such arrows, all the same length, all around the line representing “Direction of Propagation.” Each such long line represents the “crest” of one of the infinite range of waves. But when you are through, you will find that instead of an infinite number of waves, you have no waves left at all! Just a solid cylinder.

Yes, Parmenides’ old argument has reared up again, with respect to light. How can there be any distinguishing difference to characterize waves and delineate one wave from another when they are superimposed as a continuum? It is impossible. This adaptation of Parmenides’ almost humorously simple argument holds validly whether the wave sequence is assumed to be longitudinal or transverse.

And if it is impossible for a continuous spectrum to have been a wave sequence prior to resolution, then why should we believe that even the discontinuous band spectra light had to be transmitted as a wave system?

It goes thus:
1. There are band spectra.
   (a) This demonstrates light that could be of discrete wave lengths.
   (b) We could decide that the light therefore had such waves transmitting simultaneously as superimposed patterns all along.
2. But, we find continuous spectra also.
   (a) This demonstrates light of “every wave length” within the light-range.
   (b) It is impossible to have a continuous-range series of waves simultaneously superimposed, since there could be no definition possible.
   (c) We must conclude then that the “waves” might be produced by the prism, or last conducting medium, but that prior to their resolution they did not exist.
   (d) We must conclude, then, that the pulse is not of a wave nature.
3. If this pulse system is not, then the pulse of l(b) above need not have been.
4. If the pulse is not a wave, is it a particle? A “photon?”
   (a) A photon can be resolved into waves, and is a quantity rather than a particle. So not even photon pulses are particles. And even if they were, they can produce waves.
   (b) How could particles produce a continuous spectrum? If Parmenides’ argument rules out superimposed continua of waves, it even more
assuredly rules out a continuum of superimposed particles. Even of compressible ones.

The lack of precision in the definition of the concepts (speed, velocity) which are the root and branch of the mathematics of physics may have contributed to that state of affairs wherein Heisenberg said,

"---one may say that the concept of complementarity introduced by Bohr into the interpretation of quantum theory has encouraged the physicists to use an ambiguous rather than an unambiguous language, to use the classical concepts in a somewhat vague manner in conformity with the principle of uncertainty, to apply alternatively different classical concepts which would lead to contradictions if used simultaneously. In this way one speaks about electronic orbits, about matter waves and charge density, about energy and momentum, etc., always conscious of the fact that these concepts have only a very limited range of applicability. When this vague and unsystematic use of the language leads into difficulties, the physicist has to withdraw into the mathematical scheme and its unambiguous correlation with the experimental facts."  

The "complementarity" is this: Some physical results can only be explained in terms of particles, and other results in terms only of waves. The two exclusive types of description, put together, complement, or "add-to" one another so as to produce a complete description of events. The concept is that a "wave-particle" or "wavicle" exists in nature, that the wavicle sometimes acts exclusively as particle and sometimes exclusively as wave, wherefore the two different types of description are complementarily required to fully describe the actions.

The ambiguity is that as a wave, or as a particle, certain physical experimental results that do happen should be impossible. All that the switch to mathematics accomplishes is to rigidly exclude the "wrong" type of equations from being used in a specific instance.

Mathematical solutions are very often filled with "imaginary" answers, which have no application nor meaning. The mathematician often chooses from several equally "correct" answers the one that fits his question. It fits the mathematician's orientation to think that the choice of the exclusively appropriate mathematical form for a given aspect of the wave-particle dilemma has thereby removed the ambiguity. Were it true that mathematics is not ambiguous, then we should be able to arrive at consistent answers by applying either mathematical form to any given experimental result. But this is not the case.

Let us once and for all admit that we have not solved the wave particle paradox of present theory just by inventing some names for it. "Wavicle" and "complementarity" name the paradox. They do not remove it. There are incontrovertible experimental demonstrations that light cannot be a transverse

wave. There are equally powerful demonstrations that light cannot be a particle. Instead of insisting that it is therefore both, even on alternate days, why can’t we face up to the truth. If light cannot be either a transverse wave or a particle then it must be neither! It must be something else.

All that the pulse can be is an inx-rinx sorce differential. The pulses come in beats, at different distances from each other, but each pulse must be a pressure-front, a force field rather than a matter movement. When such a field travels through matter-unit atoms and/or molecules, the particles out of which such units are made, if any, or the resonance nodes and intrinsic pulses of the unit can combine with the traversing field in such a way as to produce transverse waves in the traversed material. Four dimensional “breakers.”

Light, then, is neither a wave nor a particle. It is a dinsity-sorce-pressure-gradient. Light is the pattern of gradients which can cause accompanying transverse waves whose lengths fall within defined sizes.

It is the gradient that elicits the wave and particle responses.

II

Consider a spinning atomic nucleus, with a series of standing-traveling waves setting up shell-layers as in Figure 33-2, page 233. Consider the case in which heat accumulates in a given layer, until a saturation point is reached. More heat is added. A conversion now takes place in which the heat energy is converted into a different energy (chemical), with the reorientation of size, inergy and inther dinsity pattern of that shell and then of all the rest of the layers of that atom, required for it to regain an over all equilibrium pattern with the cad matrix in which it exists, and to which it contributes its own outermost boundary layer or layers”.

A dinsity-sorce-concentration differential now emerges from the excited atom. That gradient would be polarized around the spin-pole of the nuclear nodes, but would expand in spherical planes around the atom. (Since the differential stems from a rotating source, it would emerge from the atom in a spiral, rather than in purely concentric beats. On any given inxic line, though, the successive pulses are effectively parallel. See Figure 35-2.

Traveling out from a point-source the imbalance will follow the image of an expanding spherical spiral, or plane. Such an imbalance of pressure will try to equalize in all directions, not just perpendicularly to the source or even to the line of flight. Since this brings into play the old story of infinite exther to draw from, with only finite inther available, tensions must arise on the planespherical surface of the expanding bubble. Tensions which are different from the dinsities that sate
the imbalances inxically. (It is easy to see the CURL sequences of Maxwell coming into existence here.)

In addition to the translationally moving imbalance, then, self perpendicular inx-rinx effects will accompany the gradient and modify the pattern of succeeding gradient fronts of the sequence.

![Figure 35-1](image1)

Figure 35-1.

![Figure 35-2](image2)

Figure 35-2.

In Figure 35-1, the parallel lines represent the density. The closer the lines, the denser the ether. The concentration of ether at a compression “crest” requires that
some ether has been drawn from between crests, wherefore pressure imbalances will exist in those zones. Such imbalances cannot persist, so the effect will transmit. As it does, alternating inxie density waves and then rinxic pressure imbalances will succeed each other, even coexisting simultaneously as they recreate each other. The “horizontal” lines represent sorce-pressure concentration.

The thing that transmits is a sorce-pressure imbalance. That imbalance travels as a series of longitudinal fronts, or crests. The line interval between crests may be considered a sort of “wavelength.”

The complementarity is thus seen to be simultaneous, rather than alternative, and a response rather than the primary action itself.

Very well. That does it for complementarity, but what about the quantum theory that energy is particulate, and that there can be only an “all or none” response by reacting “basic particles?” We may have cast conclusive doubt on the essential discontinuity of both matter and energy, but how shall we fit in the experimental evidence that has been interpreted as all or none response?

First, we shall examine just enough electricity theory and data to demonstrate that electricity cannot possibly be a flow of discontinuous protons or electrons. Then, having admitted that a sorce-differential is the current, we shall discourse upon the patterns of such transmitted sequences. Next we shall demonstrate that the pattern and physics of such gradients are such as to make the “indeterminacy” of existing theory irrelevant. Then we shall proceed to show that quantum emissions are effects, just like matter-units are products, rather than basic items of nature. We shall show that every transmitted sorce-spectrum energy must be partially captured by the transmitting matter-units, unless, practically speaking, a free ether is the conducting medium. And that the emissions of discrete amounts of energy are effects of the structure and physics of units and Venturi systems, rather than because the energy consisted of such quanta in the first place.
Electricity Cannot Be Electronic.

We have several times pointed out that an electron can’t move at light speed because it would be infinitely heavy and equally short at such speeds. We must introduce a better argument than that, though, if we wish to maintain our demand that electricity can’t be discontinuous. Nor is it enough for us to claim that the motions of electrons are continuous, even if electrons are particulate, wherefore a flow of electrons would represent a continuous energy.

What we are after is evidence that electricity absolutely is not a flow of electrons, nor a pattern of electrons, nor dependent upon the existence, motion or anything else requiring the presence of electron-type particles. The evidence is there for the open mind to see:

“Perhaps the easiest way of obtaining a general view of the phenomenon is to begin with the production of the x-rays in the x-ray bulb, and afterwards to follow them as they make their way outside.

“The elements of the x-ray tube or bulb are (a) the glass and (b) the two metal conductors, the cathode, and the anode or anti-cathode or target or positive terminal. We have already observed some of the phenomena which attend the discharge of electricity through such a tube when it has been largely exhausted of air. A stream of electrons is ejected from the cathode like water from a jet. It moves in a straight line, but can be deflected by a magnet: It has mechanical effects, and it heats wherever it strikes. Also x-rays radiate from the place of impact wherever that may be. The cathode-ray stream pays no attention to the position of the positive terminal if the target is used as the positive it must be put
in the right place, when the tube is being made, so that the electron stream may strike it. The positive terminal has the appearance of being idle, but this cannot be so in reality because it is wanted to complete the electric circuit. It must impart the positive electricity to the atoms and molecules that are to carry it; these, being relatively massive do not acquire the self-revealing speed of the electrons in the cathode stream. The confinement of the stream within definite bounds and the directness with which it leaves the cathode and makes its way across the tube are most remarkable. When there is a little gas in the tube the stream is visible because of the collisions between flying electrons and the gas molecules. The track of the stream is then a fine luminous pencil. Experience shows that the form is largely influenced by the shape of the tube and the cathode; more immediately by the action of the electric charges which accumulate; on the walls of the tube.

“Crookes supposed that the stream consisted of radiant matter projected from the cathode. . . Crookes was perfectly correct however, and was completely justified when J. J. Thomson showed that the stream consisted of negatively charged ‘corpuscles,’ to use his first designation, or electrons as they were named subsequently. The speed of the electron, as it shot away from the cathode, was determined by electrical and magnetic methods, and it appeared, as one might expect, that the greater the electric power applied to the tube, the swifter the flight of the electron.”

![Figure 36-1](image)

In Figure 36-1 we see a cathode C, several possible anodes A, A', A'', and even an A''' which has its back to the cathode. When an electrical circuit is closed, what flows between the anode and cathode? It cannot be an electron stream, because that stream flies straight across the tube. Does the anode impart

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some “positive electricity to the atoms and molecules that are to carry it?” If so, and said carriers “being relatively massive do not acquire the self-revealing speed of the electrons in the cathode stream”, then the electricity-carrying particles must move very much slower indeed than does an electric current. Furthermore, since there are relatively few such molecules and atoms left in the vacuum tube, there must be relatively large void areas. What carries the electric circuit across that void?

If the electric circuit can go through said void, and an electric current flows through wires, tubes, and voids at the speed of light, then this x-ray tube conclusively proves that whatever else it may be, electricity is neither the flow of electrons, molecules nor atoms. It is the flow of whatever it is that traverses the etheric continuum between particles, that causes atoms and electrons to accept and carry a charge when in its presence, that can cause the emission of quantities of radiant electrons from a bombarded cathode, and can then see those radiating electrons strike a screen and disappear.

No one has ever piled up a heap of electrons at the bottom of an x-ray tube. They just disappear. Oh, they are converted? Into x-rays? Indeed, then, since the end product of the closed circuit is an x-ray, shall we not conclude that electricity must be the flow of x-rays all along, rather than the flow of electrons, atoms or molecules?

Negative. Electricity does flow from anode to cathode, but the electron, atom and molecule and x-ray effects are just that: Effects. They are not the electricity itself.

Well, we abolished that straw man. Hardly anyone really thought that electricity is an electronic particle flow anyway. We always knew that it is a field force. All that we have proved is that even if electrons and protons were particulate, electricity itself is not.

Electricity is the plus and minus inx which, coupled with the rinx effect constitutes an electromagnetic field and flow.

II

The Pattern That Is “Light.”

Light is a portion of the electromagnetic spectrum that is a portion of the sorce spectrum. Light is a series of longitudinal pulses of sorce and dinsity imbalance.
Such an imbalance represents a difference of density and of sorce-pressure. We shall now investigate the structure of such systems.

Given a certain value of sorce and dinsity in a free-ether cad. A sorce “wave” now passes through it. That wave may represent a pressure and dinsity discreetly different from that of the cad or it may be a gradual condensation, dinsest at the center of the longitudinal sorce wave. In other words, the dinsity and pressure of the front may represent a sharp break with that of the cad, or it may take the form of a gradation, or gradient. Either way, there may or may not be zones of constant cad energy levels between the pulses of the sorce-waves.

The perpendicular lines of Figure 36-2 represent the dinsity of a cad ether. The distance between lines and their length vary as the dinsity. The longer, closer lines on the left side A represent discrete increased dinsities of sorce waves. On side B, the lines are seen to converge and diverge as the compression wave passes through in a gradient. In B, the shorter lines of least dinsity would be accompanied by increased rinx, in an inverse and three-dimensionally perpendicular manner.

Figure 36-2.
Figure 36-3 demonstrates the same thing in a different way. The three horizontal squiggles represent three different graph lines. On the vertical, density axis of the graph, 1, 2, and 3 are ascending densities and represent three individual sets. The horizontal axis of the graph represents time and distance. The lower line (A) shows the type of pulse of Figure 36-2, side A. Discrete increases of density. The middle line (B) represents discrete pulses also, but now the pulse is a gradient rather than an abrupt density change. We see that the gradient may be regular, sloping directly to a peak and back to normal. Or it may be a regular curve of variable density with no peak. Or it may increase in density toward the crest according to a geometric rate, as shown by parabolic curves. Or hyperbolic curves. Or even slopes straight up to a plateau, then down again. Or it may be any and all of them. The top line (C) represents the continuously variable density sequence of pulses demonstrated in B of Figure 36-2.

Careful! Figure 36-3 is a graph of a pattern of longitudinal compression pulses. The transverse image it assumes is not a picture of the gradient. Just an oscilloscopic conversion. A graph line. The question is, which of these patterns does a source gradient assume? The next question will be, What is the significance of special patterns of the pulse?

Light cannot be a wave system when transmitting as a continuous spectrum because: (1) Longitudinal waves cannot coexist in every infinitely close range of
interval. (2) Since white light is able to produce every wave length when put through a prism, but cannot transmit as such waves, how can it? After a good deal of thought the only answer that can be sustained is that it is the pattern of the gradient itself, rather than the length of the interval, that governs the response. Chemical reactions, as in the human eye, or a film, and physical resolutions of light pulses are all reactions to the incident light . . . they are all responses. It is impossible for light to transmit in all wave lengths simultaneously, but the response is such as to require an infinitely fine gradation of some aspect of the pulse. Something of each such pulse must show an infinitely continuous gradation. The only thing that can do that, even for one pulse, is the rate of change of dinsity and sorce-pressure. It is the slope of the graph line that must change at every consecutive point of the pulse. It only does this in the top line of Figure 36-3. That line, then, representing the rate-of-dinsity-change conditions demonstrated in Figure 36-2, side B, (and in Figure 35-2, page 248) represents the sorce-spectrum pulse form of a continuous spectrum type of light. The bottom two lines represent the type of transmission that a band or line spectrum type light can be. It is likely that the first lefthand pyramidal form of the middle line of Figure 36-3 represents a pure color in a line spectrum, since it has a constant slope. It represents an arithmetic dinsity-rate-of-change in the pulse. The next, hump-backed curve would represent a band-spectrum pulse: A smooth range of slopes, but only a part of a full curve, with intervals of unchanged cad-sorce between pulses. Of course, any of the dinsity gradients may be infinitely varied as to pattern, and such variations would show up on the graph as the squiggly lines now seen as representative of radio signal waves in some of the complex manuals now extant.

These concepts are most significant. They show the many facets involved in the phenomenon called “light.”

1. There is the sorce pulse and the gradient by which it transmits.
2. There is the accompanying inx-rinx transverse wave system in the conducting medium. The shape of that wave system is caused by the dinsity-rate-of-change that is the gradient pattern of the sorce pulse. The response of the medium to the passing pulse is also conditioned by the composition of that medium. Pre-existing pulses, nodes, or similar “particles” of appropriate size, shape, and inergy of the conducting medium will find their actions influencing and influenced by the patterns of the induced waves. They will react as per our previous discussions.
3. There is, then, the nature of the reaction of the conducting medium to the accompanying waves following the pulse. That, in turn, depends on several factors.

A. In solids and liquids the outer layers of the component atoms and molecules have merged into common cad matrix-layers. In gases, the
components are sufficiently far apart that zones of comparatively free ether exist, as the carriers of standing-traveling waves that are the outer portions of such gaseous units.

B. Solids and liquids have continuous spectra, while gases have line spectra.

C. This indicates that the nature of the light gradient is conditioned by the structure of the source body, rather than by the nature of light itself. The spectrum is actually the equivalent of an x-ray shadow-image. It draws a stretched out picture of the shell-layer structure of the emitting source. It does so by revealing the pattern of density gradients in the shell-layers themselves. And it can only do that if it is itself made up of the same pattern!

We have discussed the reorientation of all layers of a unit whenever a change of state (and thickness) follows invasion of the energy limits of a given shell-layer. It is easy to progress one step further, and to recognize that the radiating pressure-density pulses have the same timing as the shudderingly jerky shell-layer size changes that induce them. The timing of the “shuddering” size changes depends on the density gradients of those shells, and the consequent time and pattern developed by the spiraling energetic resonance waves and/or nodes as they move to the new equilibrium pattern with their environment. The gradients of the pulses thus copy the gradient patterns of their cause.

D. The continuity of the spectrum of a continuous shell-layer object, as opposed to the discontinuity of the spectrum of separate objects is extremely suggestive. It suggests that the entire surface of the radiating object emits the light pulses, in contiguous and even overlapping sequences that reflect the shape of the matrix-layers. That shape is controlled by the contained components, plus the structure of the still discrete layers around those nuclei. That the entire surface radiates explains both the gas and the solid or liquid spectra. That the pattern of radiation is an image in depth of the density and positions of the component layers and nuclei has been explained. But what happened to the quantum? To the all-or-none electron and photon collisions? Quantum theory looks suspicious.

E. Hold the phone, a minute. What happens when a density gradient enters another matter unit. What if that gradient, the depth image of a shell-layer system somewhere else, happens to approximate the pattern of the shell-layers of the conducting unit? Or even if parts of that gradient so agree with parts of the shell-layers? Unit parts of appropriate size and energy will react to gradients, and even to their induced transverse waves, if the gradients and/or waves have matching curvatures. Said unit parts can even react to, alter, steer, or capture different parts of a variable-density source-imbalance impulse, if those portions are in resonance with the matter-unit segments.
F. Should such captures occur, then the pressure-differential would of course be either eliminated or modified. All or part.

Be kind. At least admit that the partial amounts of captured exergy must correspond with pre-existing parts of the absorbing units. Even such portions must therefore obey the whole-number proportions of the matter-unit layers and nodes. Quantum theory is still very much present.

4. There is, then, the fact that the structure and shape of the light source is “imprinted” in the pattern of the pulse gradient and the interval between pulses, as in 3A, 3C, and 3D, and that appropriately patterned chemicals can absorb all or part of such impulses by recreating miniature resonating replicas of those source objects, as in 3E and 3F.

This means that in the human eye the reaction patterns set up in the various chemicals present in the rods and cones recreate the same conditions in miniature as had to exist in the light-emitting source. What we “see” is thus a physical miniature-in-depth of what exists at that source. We recognize it in the singularly beautiful manner of full “color” and form.

III

It has long been known that the ganglion cells in the retina fire at a fairly steady rate, even when not under stimulation. It has been found that the resting discharges of such cells are intensified or diminished by small spots of light played on a relatively circular area of the retina. Either of two responses are elicited depending on where in the retinal field the spot of light of light falls. In some cells the light stimulates the firing to an increased rate, and in others it inhibits the firing rate. In both cases, when the light is first turned off there is usually a burst of cellular firing. These variable rate firings suggest a simple input-impulse coding and decoding mechanism.

We intend to explore every nook and cranny of the mechanisms of matter and energy.

We do not refuse the use and discussion of mechanisms of consciousness if it helps us understand matter and energy.

Accordingly, let us very briefly consider the human mind. Where is it located? The brain is mostly a collection of fine threads which connect many cells to each other. These cells are grouped into various centers each of which controls different aspects of the person’s mental and physical being. When portions of such centers are removed, their function is lost or impaired, for a time, but often gradually resumes as surrounding areas take over. Sometimes zones that possess a
given memory are removed, but that memory gradually returns. ‘Something other than merely the neuron cells evidently must be at work.

Each cell seems to act as a reactive firing mechanism, similar in general to the retinal cell actions just described. It is unlikely that a mere coding, decoding, and firing cell is the repository and seat of intelligent consciousness. Such special firing patterns are only contributing elements. Their joined and merged fields combine to form an overall “matrix-pattern” exergy field. A field that is exergic in the full sense of the word. It permeates each and every neuron, is originated and carried by all of them collectively, is modified slightly be each cell, and in turn is independent of any given cell, once initiated can persist through changes of its medium, and can modify the actions and structure of each such cell.

Such an exergy field should set up demonstrable disturbances around itself. Indeed, it is no esoteric secret that electroencephalograms do measure and record the patterns of such energy fields around the outside of the skull. No secret that the patterns of such “external” wave systems can be “read” so as to indicate how the internal structures are behaving. No secret that the state of mind of an individual is revealed by the brain-wave pattern so measured. No secret . . . odd, not even suggested that it is the wave pattern itself, rather than the brain cells and threads, that is the conscious mind of the individual. That overall pattern which can persist when small segments of its neurons are destroyed, and by its persisting pattern can “reprint” the details on those cells which take the appropriate place in the cad.

That exergy field exists through all neurons and modifies the actions within such bodies by its presence. Just as the current must be turned on, and the parts warmed up to a constant background energy level before a radio can operate, or an x-ray machine can emit x-rays under the stimulus of sudden additional jolts of current, so must the “vis-viva” energy provide a steady energy level coursing through the nervous system, thus through the retinal cells for them to operate appropriately.
Figure 36-4.

Note the firing pattern Figure 36-4 demonstrates for those cells. There is a steady resting rate of fire which alters under the stimulus of additions and cessations of light. The light-influenced changes of the pattern coming from the retina change the general brain-wave pattern accordingly, after being screened and decoded at the appropriate brain centers. The change of brainwave pattern is therefore such as to permit the density-gradient system that is “consciousness” to simulate in its very own structure, the patterns and structures of the objective world.

The regular firing pattern of the resting cell indicates that certain amounts of brain-sent energy steadily accumulate, and that once a specific amount has been reached a burst is triggered. The fact that the addition of light energy specifically
modifies the timing of that firing pattern shows that light somehow changes the rate of accumulation in the cell chemicals.

The fact that the addition of light speeds up the rate, at which some cells reach a saturation point at which they fire a “quantum” burst, but slows down the accumulative rate of others is intriguing. The difference of response of different kinds of retinal cells requires that the same stimulus can have opposite effects. Since the energy of cells is known to consist of heat, electromagnetism, and chemical secondary forms, the vis-viva energies are the same ones we have been studying all along.

Sorce and absolute motion are the only basic energies. Whether chemical, heat or electromagnetic, the changes of energy can only be faster or slower motions, and greater or lesser pressures. Whichever is happening under the vis-viva energy, light either speeds or slows the rate at which it accumulates. Many different mechanisms are possible. For instance, some cells may accumulate a positive pressure and some a negative pressure, which reaches a certain peak before eliciting a firing reaction. Or, the rate of an inergetic chemical change may be slowed by efferent vis-viva energy which light may counteract so as to allow the reaction to proceed to discharge peaks more rapidly. Or vice versa. Or the chemicals may slow the flow of electrons responding to the local field, or bar it, until pressure peaks are reached that allow a transmission, and that transmission may dissociate the chemical required for the transmission so as to create a built-in make-break circuit. Or many other interactions between chemical, heat, and electromagnetic energy may occur. But any and all of them require that either the light itself, or portions of it, or conversion factors involving it are causing changes of rate of firing intervals in conversions among different secondary energies. Such actions require relatively long-term accumulations rather than only the instantaneous effect stipulated by an all-or-nothing quantum mechanism.

The firing pattern of retinal cells thus demonstrates again that the discontinuous “quantum” appearances of certain forms of energy are conversion effects between secondary energy 1 and secondary energies 2, 3, or 4. It takes a certain minimum increment of energy to elicit a shock-wave response by a matter-unit shell-layer system. That energy can be accumulated in a different secondary form from that in which the response is expressed. While the conversion response can be discontinuous, energy itself is not.

So far as the present physical theories are concerned, there is a very important detail to be considered here. . Modern quantum theory considers energy to be essentially discontinuous. We have previously stated that this is impossible when framed within the scope of our definition of energy. Since we represent that definition as an explanation of the physical reality itself, it follows that if energy really is merely the impulse of pressure or motion, it cannot be discontinuous.
Turn on one of those home hand vibrators again. It will vibrate with a certain frequency. Press your hand against the floor. When the applied pressure passes a certain level, the whole floor will suddenly take up the vibration, but there will be a drastic slow down in the frequency of the vibrator. Of interest is the fact that there is a temporary transition period during which the frequency changes, but that the new frequency remains constant, and once begun it remains independent of how much harder you press down on the vibrator.

What we see here is an example of apparent discontinuities of energy which are, in fact, the result of additions of specific portions of material into the scope of constant supplies of energy. The vibrational rates depend upon the amount of material under the influence of the inergy. Since matter-units everywhere contain density-energy layers, each with its own frequency, and since they are relatively discontinuous (though contiguous), reactions to various kinds of energy can appear to be discontinuous even though the energy itself be smoothly applied or varied.

It is not energy per se which is discontinuous. It is the sudden and discrete change of the amount of field involved in a specific secondary form of energy which causes the apparent discontinuities. All forms of energy are interconvertible, differing primarily in the level of organization matter-unit to which they are intrinsic. Since there are maximum amounts of inergy a given level unit may contain, any form of energy which is being added to a unit will reach such a saturation point. The addition of more of the same secondary form of energy can no longer be accepted unless it is changed into a form of energy which involves some other matter-unit level.

Even in Millikan’s “oil drop experiment,” from which it was concluded that electricity is atomic, nobody claimed that the electromagnetic field through which the oil drops fall is “atomic.” The strength of the field is time-constant and the field itself is spatially continuous. The charge on the drop was found to come in integer amounts. It is our conclusion that the reason for the charge appearing only in integers is that the component units of the drop have shell-layers with whole-number wave systems within themselves, wherefore the “quantumness” of “electrons” is not because electricity or energy is “atomic,” but is a result of the structure of the drop itself. Even when the “drop” is an atom.

If we start with a vibrating and spinning nucleus plus a series of concentric layers of ether of varied density and different resonance frequencies, and we alter the exergy so as to cause the innermost shell or shells to suddenly acquire the mode of vibration of the core, the inergy of that core would now be spread into a discretely greater amount of material. The specific amounts of material added, being the circumnuclear shells, would be within 0.5 percent of the whole number
multiples of each other that the shells are. Should the several shells condense to the same density, similarly discrete portions of matter would have been rearranged with a given energy. A sudden and discrete change in the resonance frequency would follow, with a short, sharp transition period during which whole series of rearrangements of the modes of vibration of all shells would occur, with specific quantities of energy or matter in excess or deficiency.

In the previous parts of this book we went to great lengths to establish the conclusion that although matter-units may be somewhat discontinuous, matter itself is continuous. Similarly, although the appearances of the secondary forms of energy may have elements of discontinuity, energy itself, motion and/or pressure, is continuous both in action and in quantity. Although the frequency of vibration changes in discrete amounts as we add discrete amounts of matter to the field of the vibrator, it is possible to alter the power in a smooth curve. It is the response, not energy or the basic material, that is sometimes discontinuous.

The discontinuities in energy emission represent conversions from one secondary form of energy to another. These occur when a layer of a unit becomes saturated with the steadily accumulating energy, and goes through a change of state as it converts the next increments of energy into energy of a different secondary form. That conversion is accompanied by density, thickness, and equilibrium resonance rate changes of the layer such as to permit its inther to again accumulate the original secondary energy at a steady rate.

IV

Excerpts from “The Thermodynamics of Air at High Velocities,” by Neil P. Bailey in the July 1944 issue of the Journal of the Aeronautical Sciences, help us understand the mechanisms of the matter-unit shell-layer energy boundary limits to which we have referred in several prior sections.

1. “It is of interest to note that heating means acceleration and cooling deceleration below the acoustic velocity, but in the superacoustic region heating produces a deceleration and a small amount produces a large change in Mach number.”

2. “Friction raises the Mach number with falling pressure below the acoustic, but lowers the Mach number with rising pressure for a superacoustic stream.”

“...a pure friction process will always cause the air flow to approach the acoustic, since that is the condition of maximum entropy.”

3. With respect to nozzles that diverge or converge, he says, “In Equation 80 the velocity gradient (dv/dx) is expressed in terms of the rate of divergence, the friction, and the Mach number. For the parallel wall or constant area case
previously considered, dA is zero, and the velocity gradient is positive for M less than 1, and negative for M greater than 1. For the ideal diffuser or nozzle \((\dot{f} = 0)\) and below the acoustic, a positive \((dA/dx)\) or divergence gives a negative \((dv/dx)\) or a diffusion. A convergence or \((-dA/dx)\) represents an acceleration. Above the acoustic, a plus \((dA/Dx)\) or divergence gives an acceleration and a minus \((dA/dx)\) represents deceleration.

“When both friction and area change are present, there are four possible cases.

Subacoustic Nozzles

“For this case \(dA/dx\) is negative, and both friction and convergence act together to produce a positive velocity gradient that gets extremely large when \(v\) is large, \(A\) is small, and \(M\) is near unity.

Subacoustic Diffusers

“A divergence or positive \((dA/dx)\) tends to produce a minus \((dv/dx)\) or a deceleration, but the effect of friction is contrary to this, tending to accelerate. Diffusion would cease when

\[
\frac{f \cdot M_2}{2M} = (1/A)(dA/dX)
\]

for a conical diffuser \(A = \oint r^2\)

\[
m = \frac{\oint r^2}{2\oint r} \quad \text{and} \quad \frac{dA}{dx} = \frac{dA}{dr} \frac{dr}{dx} = 2\oint r \frac{dr}{dx}
\]

(81)

this gives

\[
\frac{dr}{dx} = \text{tangent of the wall angle} = \frac{f \cdot M_2}{2}
\]

(82)

Superacoustic Nozzles
“A divergence when $M$ is greater than 1 produces acceleration, while friction tends to decelerate, so such a nozzle would be subject to the limitations of Equation 82.

Superacoustic Diffusers

“For this case a minus $\frac{dA}{dx}$ and friction both produce deceleration when $M$ is greater than 1.0. In fact, friction alone is an efficient superacoustic diffuser at velocities less than $M = 1.3$.

Flow Through Plane Compression Shocks

“When air is flowing at a velocity below the acoustic ($m$ is less than 1), a pressure wave that moves at the acoustic velocity can travel upstream. In this way any obstruction or restriction in a passage can cause the entering flow to adjust to fit it. However, when the airflow is superacoustic ($M$ greater than 1), a pressure wave cannot travel against the flow and the air upstream cannot be warned of trouble ahead. Each particle of air must discover the obstruction for itself.

“Such a situation is illustrated by the data plotted in Fig. 9. The air left the parallel portion of the nozzle throat at a distance of 0.50 in., with a velocity slightly above the acoustic. For the next 0.05 in., it attempted to diffuse but later used the divergence to accelerate to 1.31 Mach number at 1.0 in. In the next inch, under the influence of friction and angle shocks from the walls, the Mach number dropped to 1.245, and at that point it still had 3 in. to flow to the end of the tube.

“From Fig. 5 the value of $\frac{f \Delta x}{2m}$ for $M = 1.245$ air to reach the acoustic by friction is 0.0323. For $m = 0.565/4 = 0.1415$ in. and $f = 0.005$, only 1.31 in. of pipe is required to bring the flow to $M = 1$, below which it cannot drop by pure friction.

“This situation brought about the plane compression shock at the 2-in. point at which the Mach number was reduced to 0.805 at 2.9 in. For the remaining 2.1 in. the flow again accelerated by friction and left the tube at $M = 1.0$. This acceleration from $M = 0.805$ to $M = 1$ in $x = 2.1$ in. corresponds to a flow friction factor ($f$) (Fig. 6) given by $f = \frac{f \Delta x}{2m} = 0.050$ or $f = \frac{(2)(0.050)(0.1415)}{(1.395)(2.1)} = 0.0048$. 

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“A plane compression shock is assumed to take place at constant total energy at constant flow area and in such a short distance that wall friction can have no part in the pressure change. The first two conditions are defined by the Fanno Equation 48,

\[ P_1M_1\sqrt{1 + [(\gamma - 1)/2]M_1^2} = P_2M_2\sqrt{1 + [(\gamma - 1)/2]M_2^2} \quad (95) \]

The second and third conditions are stated by the Rayleigh Equation 55,

\[ \frac{P_1}{P_2} = (1 + [M_2^2])(l + [M_1^2]) \quad (96) \]
If Equations 95 and 96 are solved for the relationship between $M_1$ ahead of the shock and $M_2$ after the shock, the result is

$$\frac{1 + \sqrt{M_1^2}}{m_1 \sqrt{M_1^2} + [2/(\sqrt{1})]} = \frac{1 + \sqrt{M_2^2}}{m_2 \sqrt{M_2^2} + [2/(\sqrt{1})]} \quad (97)$$

“Table 3 and Fig. 10 show the solution of Equations 96 and 97 for the theoretical plane shock. The shock of Fig. 9 started at $M_1 = 1.245$ and $P_1 = 28.0$ in. of mercury and terminated at $M_2 = 0.805$ and $P_2 = 46.5$, giving a pressure ratio of $P_2/P_1 = 1.66$. Using Fig. 10, such a shock should terminate at $M_2 = 0.81$ and yield a pressure ratio $P_2/P_1 = 1.65$. This is typical of the check between theory and test for plane compression shocks.

“The location of a compression shock in a passage and the Mach number at which it is initiated in any case depend on the initial Mach number, the pipe length, and the back pressure, but for a given set of conditions it will always occur in the same way.
“If an impact tube is placed in an air stream flowing below sound velocity, the ratio of total or impact absolute pressure to the static pressure at that point is given by the reversible compression of Equation 25 and Fig. 2. However, when the flow is superacoustic, a plane shock bow forms ahead of the impact tube, and in that shock the pressure rise and Mach number change of Fig. 10 occur.

Figure 36-7.

“When the air is then brought to rest reversibly at the stagnation point at the impact tube nose, the total pressure rise realized is not the reversible value from Fig. 2. It would be, instead, the product of the shock pressure ratio and the reversible pressure ratio to bring air at the resulting Mach number to rest.

“For example, for an initial Mach number of 2.0, the shock would produce a pressure ratio of 4.50 and reduce the Mach number to 0.577. When air at this
Mach number (0.577) is brought to rest reversibly, the additional pressure ratio would be 1.252, giving a total pressure ratio of (1.252) (4.50) or 5.65 instead of the ratio of 7.90 that would result from a reversible compression.”

Summary of Reactions of Subacoustic and Superacoustic Streams to Stimuli

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Subacoustic</th>
<th>Superacoustic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>Accelerates</td>
<td>Decelerates</td>
</tr>
<tr>
<td>Cooling</td>
<td>Decelerates</td>
<td>Decelerates</td>
</tr>
<tr>
<td>Friction</td>
<td>Accelerates, with decreased pressure</td>
<td>Decelerates, with increased pressure</td>
</tr>
<tr>
<td>Convergence of walls</td>
<td>Acceleration</td>
<td>Decelerates</td>
</tr>
<tr>
<td>Divergence of walls</td>
<td>Deceleration</td>
<td>Acceleration</td>
</tr>
</tbody>
</table>

Divergence plus friction oppose each other, but in reverse manner for the two differently rated streams. Convergence plus friction causes an increasing rate of acceleration for subacoustic streams, but a deceleration for superacoustic streams. Friction, alone, acts as an efficient decelerator from 1.3 M to 1 M.

It is noteworthy that each stimulus except divergence slows the superacoustic stream. If divergence causes acceleration, then acceleration could cause divergence. In that event, the addition of energy to a shell-layer possessing a super-minima inergy level would cause expansion of the shell and the unit. This would explain how heat can be a plus energy, yet can cause expansion of a shell. It answers the perplexingly vexing question of how heat can represent increased speed, can be trapped and converted into chemical inergy, still being an increased speed, can fail to increase the pressure inxwardly, yet can cause the matter-unit to expand. Note that in the superacoustic stream friction causes deceleration with increased pressure. An acceleration should therefore be accompanied by a decreased pressure and a divergence. Also, note that these actions occur only between certain minima and maxima inergy levels, and that the levels themselves are equilibrium points between inergies and exergies of the cad. Entropy levels.

The fact that the pressure rise from a superacoustic stream’s return to rest is not the same as it would be if there were no sonic-speed boundary is most suggestive. A very specific quantity of pressure is involved in the shock. For the
final ratio to be 5.65 rather than 7.90 means that 2.25 units of pressure were used up by the shock mechanism.

There can be no doubt that we have here an exact analogy, in fact an example, of a quantum of energy. Very specific amounts of energy are required to satisfy the shock mechanism involved in penetrations of boundary limits of energy maxima and minima of shell-layer systems in equilibrium states. With such shock-system energy manifestations, always of a specific quantity for a specific penetration, the thicknesses and physical state of the shells involved in the action change, as discussed in Chapter 32.

Here, in a nutshell, is the whole mechanism of the quantum action. It is a result of the relations, anatomy, and physiology of the matter-unit system. It is the response to the inergy-exergy equilibrium states and energy changes between them, to the density and pressure effects of inx-rinx actions and the conversions of inergies at one inergy limit into specific amounts of exergies, or of exergies into inergies.

This is both an all-or-nothing affair and a continuous energy-level change. There is (1) an accumulation between inergy boundary limits, (2) a shock-wave action with finite amounts of energy required, as such limits are penetrated, (3) a change of physical density-inergy concentration of material (i.e., a physical change of state), and then (4) the ability to again accumulate energy, but under different conditions than before the limit-penetration.

A given material with a given initial Mach-plus speed and a final Mach-minus speed always loses the same quantity of energy—the irreversible pressure differential value. It always has a specific shock wave manifestation, and that manifestation is always caused by the same thing, which is the fact that the speed of flow is such that the compression wave cannot advance ahead as a warning.

The value of that specific quantity of shock energy for different media is as variable as is the value \( E = K v \), where \( E \) is the energy of a quantum, \( K \) is Planck’s constant number, and \( v \) is the infinitely variable frequency of the emitted wave.

In principle, the amount of energy in a quantum is infinitely variable. The quantum is decidedly not a basic item of nature, nor is energy essentially particulate.

From a certain point of view the energy is quantate. If you are studying “chemical energy” you would find that it only appeared at vaporization or liquefication levels, and then only in discrete amounts. All or nothing. If you ignored the interconvertibility of heat and chemical energies, it would follow that “chemical energy” is found only in “quantum” units, and then only at certain fixed energy levels of the object. Actually, that may be true, but the object can absorb energy, as “heat,” all along a continuous range, where that energy only takes the “chemical” form at the pre-established levels.
A quantum of light, then, can only be absorbed or released in quantum bursts, as “light.” But what is to stop the electron shell layer from absorbing a different kind of energy until it has enough of it to give forth with a quantum burst of light?

What would we call the most basic energy out of which all these quantum types arise? “Pressure and motion.” It is all the same street, but it widens out at set intervals, and at each widening we give it a new name.

Since there is a whole-number ratio of thicknesses of the shell-layers of successive members of the Periodic Table, it is understandable that similarly there will be whole-number multiples in the specific quanta of energy involved as these materials undergo such shock-barrier penetration responses. It is also to be expected that the inergy transmission limit in these layers will be the speed of light.
Chapter 37

Understanding of Quantum Mechanisms
Eliminates Uncertainty

An abstract of “The History of Quantum Theory,” Chapter 11 of Werner Heisenberg’s book “Physics and Philosophy” (1958) follows:

The origin of quantum theory is connected with a well-known phenomenon. Any piece of matter when heated starts to glow, gets red and white hot at higher temperatures. For a black body, the color depends solely on the temperature.

During the time when Planck was studying this problem Curlbaum and Rubens had made very accurate new measurements of the spectrum of heat radiation. One day Planck and Rubens met and compared Rubens’ latest results with a new formula suggested by Planck. The comparison showed a complete agreement. This was the discovery of Planck’s law of heat radiation.

When Planck sought a physical interpretation of the new formula he soon found that the radiating atom (oscillator) could only contain discrete quantities of energy (quanta).

Einstein picked up this revolutionary concept and used it upon two existing problems. One was the so-called photoelectric effect, the emission of electrons from metals under the influence of light. Tests had shown that the energy of the emitted electrons did not depend on the intensity of the light, but only on its color or, more precisely, its frequency. Einstein could explain the observations by interpreting Planck’s hypothesis as saying that light consists of quanta of energy traveling through space. The energy of one light quantum should, in agreement
with Planck’s assumptions, be equal to the frequency of the light multiplied by Planck’s constant.

The other problem was the specific heat of solid bodies. Einstein showed that one could interpret this behavior by applying the quantum hypothesis to the elastic vibration of the atoms in the solid body. These two results marked a very important advance, since they revealed the presence of Planck’s quantum of action—as his constant is called among the physicists—in several phenomena which had nothing immediately to do with heat radiation.

By the application of quantum theory to the Rutherford atomic model, Bohr could explain the stability of the atom and, in some simple cases, give a theoretical interpretation of the line spectra emitted by the atoms after excitation through electric discharge or heat.

Bohr’s theory opened up a new line of research. It was from this time on that physicists learned to ask the right questions, and asking the right question is frequently more than half way to the solution of the problem.

What were these questions? Practically all of them had to do with the strange apparent contradictions between the results of different experiments. How could it be that the same radiation that produces interference patterns, and therefore must consist of waves, also produces the photoelectric effect, and therefore must consist of moving particles? How could it be that the frequency of the orbital motion of the electron in the atom does not show up in the frequency of that emitted radiation. Does this mean there is no orbital motion? Again and again one found that the attempt to describe atomic events in the traditional terms of physics led to contradictions.

During the early twenties the physicists gradually learned to avoid the contradictions through choice of certain modes of expression limited to certain categories of experimental results. This did not give adequate results, but it changed the minds of the physicists in such a way that they somehow got the spirit of quantum theory. Many discussions, ideal experiments, and occasional real experiments helped clarify some problems.

The strangest experience of those years was that the paradoxes of quantum theory became even more marked and more exciting. There was, for instance, the experiment of Compton on the scattering of x-rays. Earlier experiments on interference left no doubt that the scattering of light happens thus: The incident light wave makes an electron in the beam vibrate in the frequency of the wave; the oscillating electron then emits a spherical wave with the same frequency and thereby produces the scattered light. However, Compton found in 1923 that the frequency of scattered x-rays was different from the frequency of the incident x-ray. This change of frequency could be formally understood by assuming that scattering is to be described as collision of a light quantum with an electron. The
energy of the light quantum is changed during the collision. And since the frequency times Planck’s constant should be the energy of the light quantum, the frequency also should be changed. The two experiments—one on the interference of scattered light and the other on the change of frequency of the scattered light—seemed to contradict each other without any possibility of compromise.

By this time many physicists were convinced that these apparent contradictions belonged to the intrinsic structure of atomic physics.

Bohr, Kramers, and Slater tried to solve the apparent contradiction between the wave picture and the particle picture by the concept of the probability wave. The electromagnetic waves were interpreted not as “real” waves, but as probability waves, the intensity of which determines in every point the probability for the absorption (or induced emission) of a light quantum by an atom at this point.

This concept of the probability wave was something entirely new in theoretical physics since Newton. Probability in mathematics or in statistical mechanics means a statement about our degree of knowledge of the actual situation. The probability wave of Bohr, et al, however, meant more than that; it meant a tendency for something. It was a quantitative version of the old concept of “potentia” in Aristotelian philosophy. It introduced something standing in the middle between the idea of an event and the actual event, a strange kind of physical reality just in the middle (muddle?) between possibility and reality.

Later Born took this idea of the probability wave and gave a clear definition of the mathematical quantity in the formalism, which was to be interpreted as the probability wave. It was not a three-dimensional wave like elastic or radio waves, but a wave in the many-dimensional configuration space, (of all things, our “cad” is here), and therefore a rather abstract quantity.

The final solution was approached in two different ways. The question was put: Is it true, perhaps, that only such experimental situations can arise in nature as can be expressed in a mathematical formalism that seemed in various atomic experiments to be absurd? The assumption that this was actually true led to limitations in the use of those concepts that had been the basis of classical physics since Newton. One could speak of the position and of the velocity of an electron as in Newtonian mechanics and one could observe and measure these quantities. But one could not fix both quantities simultaneously with an arbitrarily high accuracy. Actually the product of these two inaccuracies turned out to be not less than Planck’s constant divided by the mass of the particle. Similar relations could be formulated for other experimental situations. They are usually called relations of uncertainty or principle of indeterminacy.

---

1 This is a clear admission that part of the energy of a quantum can be absorbed, and that the quantum cannot be a “particle of energy.”
The other approach was Bohr’s complementarity. Schrödinger had described the atom as a system not of a nucleus and electrons but of a nucleus and matter waves. Bohr considered the two pictures—particle picture and wave picture—as two complementary descriptions of the same reality. Any of these descriptions can be only partially true, there must be limitations to the use of the particle concept as well as of the wave concept, else one could not avoid contradictions. If one takes into account those limitations which can be expressed by the uncertainty relations, the contradictions disappear.

In this way since the spring of 1927 one has had a consistent interpretation of quantum theory, called the “Copenhagen interpretation.”

(End of Abstract)

I I

We agree that matter-units have spherical-layered parts, that each part has a natural frequency and a narrow range of acceptable inergy, that the absorptions and releases of excess exergies from such layers will require general rearrangement of density and pattern throughout the unit, that such rearrangements will yield sudden, specific amounts of source-waves (or absorb them), and that certain manifestations of energy may come in specific quantities. We do not agree that the quantities of energy are a basic item of nature, nor that they require any ultimate discontinuity nor “atomicity” of energy itself. Neither source nor motion is discontinuous.

We agree that quanta exist. We can agree that electrons and/or electron shell-layers can act as oscillators. We can agree that the rate of vibration of a layer-shell may be temporarily excited into a new rate, and that the return to equilibrium can be accompanied by release of the excess exergy as “scattered light.” Or even that a local node in a shell may itself partake of oscillations, to later release them again at some rate of vibration either the same or not the same as the incident exciter. We do not agree that nature is in any way composed of mathematically abstract “probability,” nor that two incompatible, though “complementary” descriptions of one physical reality are desirable or necessary.

Experiments to Try

1. Get a rubber bowl and a vibrator which has several speeds. Fill the bowl half full of water. Turn on the vibrator. Now gently hold the bowl against the
vibrator and note the rippled surface of the water. Now press harder. The rippled surface assumes a pebbly appearance. Now press harder. Small drops begin to jump out of the water. Press harder. More and more small drops hop out, and the harder you press, the more numerous the drops and the higher they jump. But they remain all about the same size! (On my vibrator there were two general sizes of water drops noticeable.)

Now set the vibrator at a greater speed and repeat the procedures. You will note that the water drops remain the same size as before, but that they jump higher and sooner with less pressure applied by you.

2. Get a small pane of glass and place a drop of water on the underside. Look down through the drop. See the rings? (The layered shells.)

3. Get a bottle. Turn on a tap of water and hold the bottle so that it hangs rather loosely from your fingers, with one side against the stream of water. You would expect that the pressure of the water would push the bottle away from the stream, wouldn’t you But it doesn’t. It “attracts” the bottle into the stream. A “venturi” effect.

4. Note that the period of a pendulum, or of a vibrating string, remains the same even though the length of the arc steadily decreases. Note that the length of the suspending cord inversely governs the actual time of the period.

5. Set up four pipes, each of which empties into a common basin. Close a valve in the bottom of each pipe, fill the basin high enough so that the water level is above the open end of each pipe, and then fill each pipe to a level different from any of the others. Now open all the valves. You will note that the water level in the pipes oscillates up and down at a decelerating rate of motion, but with a regular period, until the water level in all the pipes finally becomes equal.

Now, if you are acquainted with quantum theory, consider these experiments with the various aspects of quantum theory until you begin to understand what the mathematics refers to. Until you begin to realize that whenever an “electron jumps orbits,” the “orbit” has itself jumped—the atomic or molecular “valence” shell (that continuous material layer, or “shell,” to which we have so repeatedly referred) has expanded or contracted and in so doing has set up an energy release consisting of a set number of vibrations over a set period of time. Consider that whenever one such shell jumps size, all the remaining shells of the matter-unit must follow suit, one after another until the equilibrium of all environmental levels, with the regularity of the size orders, has been reestablished. Consider the fact that the final result of such jumpy, jerky size changes is that the net size of the matter-unit has changed, as well as that the net average density of the continuous material of the shells has also changed. And finally, consider the fact that even though similar sized particles can be shaken out of similar continuous materials, where the size of the particles is constant but the numbers of them, and
their speeds, varies with the applied force, such particles do not necessarily exist within the continuum to start with.

Considerations on Quantum Mechanisms

Droplets jump from the vibrating surface of a bowl of water even though no such droplets existed, as such, in the water. Similarly, the photoelectric effect requires neither that discrete, point-sized electrons pre-exist at certain spots in the metal, nor that the incident light energy is either particulate or only present at the spot from which the electron emerges. The incident energy can be spread over the surface of the metal, even if only as a shock wave or an inx-rinx imbalance. The leaping of point-source electrons could be exactly equivalent to the leaping droplets of water. The size of the droplet is a function of the nature of the medium, and its rate a result of the overall exergy.

In the shell-layers of an atom or molecule, the material is always the same. It is the ether. The pattern of the material is such that the outer layers are at the same sorce-pressure as the zone of the cosmos in which the unit exists. Those outer-layers are not discrete for each atom, in molar objects, but permeate the object as the matrix-layer of the cad. In metals, we see that when such layers are subjected to certain vibrational stimuli, there will be several secondary forms of energy that become evident. There is always heat, when a “photon” strikes metal. There is an electromagnetic effect, necessarily, since the photon is construed as electromagnetic. And there is the emission of an electron. One of those “particles” that can never fill a bottle, nor a TV picture tube, no matter how long we pour them in. One of those “particles” that we have specifically not included as a self-persisting matter-unit. A “particle” which, like a photon, is not a self-persisting intner-energy configuration, but is, instead, a wavicle, i.e., a wave system that transmits a sorce-imbalance’s inergy through an extheric field, with extheric inx-rinx side effects.

Wherefore:
1. The exther field is made up of the matrix-layers of the cad. The side effects as well as the imbalance, while present, exist in the material of the cad.
2. The imbalance that is a photon, an electron, or any other transient wavicle that cannot stand still and continue to exist, exists at some part of that matrix system for the moment. It cannot stay there, however, because energy imbalances ever tend to equalize.
3. To the receiving object, the stimulus of an efferent photon is that of an inx-rinx vibratory wave system expanding from the surface inward. The directions of that efferent effect will be altered by the dinsity gradient already present. That
gradient is such as to be able to keep certain wave systems trapped in certain shell-layers. Accordingly, the efferent photon effect tends toward similar patterns and accumulates to a critical value at just the same positions as the concentrations of nodes and wavicles intrinsic to those layers. Under the influence of such vibrations, we would expect the same stages as in the vibrated bowl of water. First, a rippled effect with internal wave systems flowing through the molar object. “Heat.” Then a pebbled effect as the impulse is strengthened. Then, when enough energy is supplied to penetrate the inergy boundary limit, the “pebbles” sharpen into points from which droplets leap with a certain minimum amount of energy.

4. It is understandable that a compensating source change anywhere in the cad will eliminate the imbalance all around. The removal of energy from any point 1 in the form of an “electron” jump can eliminate source imbalances at points 5, 6, and 7 even though no electron jumped at those points and even though insufficient energy existed at any of those points to create and emit a local “electron.” In short, source imbalances at points 1, 2, 3, and 4 may add up to one quantum of energy and a jump must then occur somewhere in the system.

5. The efferent source imbalance is an alteration of the inergy of the cad. Since this represents a change of the source-balance of the cad, that atom most nearly imbalanced will “blow.” Just like a balloon that springs a “soft spot.” Once the soft spot starts, it steadily weakens itself so as to become the focus of matrix imbalance. In a photoelectric-effect mechanism, the efferent impulses condense whenever they enter dinser ether . . . just as neutrons and similar items get smaller as their abram increases. The dinsest layer-zone is that “soft spot” of the metal which is analogous to the blowout point of a balloon. That dinsest zone is closest to the inergy-boundary-limit, it is most able to refract incident wave systems into itself, such incident waves will then condense into tighter patterns, and bloop! A quantum burst. An electron jumps. Once the jump is complete, a new matrix strength must exist throughout the cad.

6. IT IS THE STRENGTH OF THE MATRIX THAT VARIES WITH EVERY LOCAL QUANTUM JUMP, thus A LOCAL JUMP CAN SATISFY THE IMBALANCE OF A WHOLE FIELD. The electron action may be quantate, but energy is not. The jumping piece is a discontinuity, but the matrix is a continuous part of a continuum.

7. We conclude that a quantum action is the local emission of excess energy from the vibrated surface of any atomic or molecular valence shell, even though the vibratory energy permeates the general structure. Further, we see that the potential for any jump is directly affected from moment to moment by the jumping of each given droplet, and the consequent removal of inergy.

8. A consequence of this, considered with item 3, is that as the excess inergy of the “soft spot” is released, it too changes size as it leaves the area of greatest
density. The electron, then, as well as the photon, quantum and all, can expand all over the place, and contract again somewhere else, as it is transmitted through and by ether of very variable density. Why, one photon coming from a star with one quantum of energy, might spread so wide as to cover a whole telescopic mirror, yet change the cad potential of the mirror in just the right amount and pattern as to cause an electron to leap from next to one little atom therein.

Discussion on “Wave Paradox” in Theory

There is a time lag between the initial contact of a quantum of incident light and the spreading of that stimulus through the contacted surface. Successive impulses from different directions, if not too far apart in time, will create an interference pattern on that surface. Under the influence of such an overlapped ripple pattern, certain points of reinforcement of impulse will allow the same leaping drops to appear as appeared with the vibrated bowl of water.

Now, the paths an energy unit will follow are controlled by the angles of incidence, the speed and strength of the wave or particle, and the density gradients of the conducting media. A wave-exergy will curve into the zone of greater density. Accordingly, such energy will tend to concentrate, to accumulate, and to move into an area which is denser. Since the presence of energy causes the density to increase, and the increase of density causes exergy to be trapped, we have here a mechanism that keeps energy from dissipating freely, that creates a time lag pattern in the conducting medium. There are energy boundary limits beyond which energy-density reversals occur, as demonstrated by the fact that . . . a pure friction process will always cause the airflow to approach the acoustic, since that is the condition of maximum entropy.” The time-lag accumulation pattern in a quantum-accepting object may therefore cause occasional emissions of electrons, but it also will cause temporary changes in the local gradients of the matrix layer. If subsequent quanta arrive in time, they will be steered in paths conditioned by the inx-rinx time-lag patterns already initiated by the prior quanta.

Indeed, such an inx-rinx time-lag effect will exist all around the line of flight of a quantum of source-imbalance-density-gradient-energy-pulse. Even in the material that makes the boundary of a pinhole.

The famous ideal “experiment” in which quanta of light successively pass through two near pinholes, to strike a photographic plate, and then set up an interference pattern is no problem. No wave-particle argument here. Whether light
is a wave or a packet of waves, whether it goes through one pinhole at a time or both, interference patterns will result. The path of each successive pulse packet of longitudinal light waves, will be conditioned by the structure of the field, and the structure of the field is conditioned, for a time, by the quanta that have just passed through it.¹

Nutshelling the thing again, we find that Bohr’s “complementarity” is the result of the erroneous concept that “a certain thing cannot at the same time be a particle (substance confined to a very small volume) and a wave (a field spread out over a large space), but the two (pictures) complement each other.” ² That mistake, in turn, was based on the idea that space is a void. In a void, a particle is discrete, has a finite size, and does not extend through a field. A wave, presumably, somehow does extend for very large distances.

Once we recognize that space is filled with physical and real material substance, the ubiquitous ether, and that a particle is a local configuration of such an ether, the “paradox” disappears. Every wave or particle has a central configuration that can be designated, plus a field effect that permeates large areas. The complementarity does exist. But it is not a mutually exclusive alternate affair at all. It is a simultaneous duality that poses no contradictory paradoxes, requires no mysterious probability functions, no abstract mathematical treatment, and no indeterminacy. A wave is a wave is a particle is a wave complex is a particle. It is a particle whenever the inergy moves with inther, rather than through exther. And when it does, wave complexes necessarily inx-rinx around the rosy.

What is “Indeterminate”

“. . . (Compton) found that when light is radiated from a given atom and strikes another chemical substance in which the electron-proton structure is not very rigidly fixed, the light wave can cause a given electron to move off in space. Moreover, the speed with which the electron departs is independent of the

¹ Editors note: It is unnecessary to assume that light travels through the twin slits separately in the form of wave-packets. The detection of a ‘photon’ is much more complicated and unpredictable than a simple detection of the presence a wavefront. It is complicated by the harmonic interaction between the continuous light-wave patterns and the equillibrating system of waves in the receiving electronic shell. When the harmonics of the interaction are just right, the reaction will take place and the shell will absorb the local portion of the reacting wavefront. This event results in a ‘particle-like’, all-or-nothing type of response (a "photon"), which is the appropriately-patterned quantity of lightwave pressure absorbed by an interacting atom of the detector. See www.anpheon.org for more details.

intensity of the light. Also, in this process the wave itself suffers no decrease in velocity, but merely a decrease in frequency. Thus, waves behave as if they were corpuscles. This is known as the Compton Effect.

... Heisenberg points out that the Compton Effect makes it impossible for us to determine both the velocity and position of an electron at the same time. ... Hence Heisenberg concludes that it is impossible for us to observe the initial conditions of natural processes. This doctrine is known as the Principle of Indeterminism. It has been generalized and is known as the uncertainty relation. The suggestion arises, therefore, that there is contingency at the basis of things."

The situation is: (1) Light quanta cause electrons to oscillate in the same frequency as the incident light, thus to emit spherical waves of “scattered” light. (See Heisenberg’s abstract on page 302.) (2) X-ray quanta causes emission of different frequency light, and is thought to represent a collision between an electron and a quantum “particle” of x-ray energy. (3) The speed of the rebounding electron does not depend on the intensity of the light (but does depend on the color, i.e., “wave length” or frequency). (4) “... the wave itself suffers no decrease in velocity, but merely a decrease in frequency,” says our Compton quote above. Let’s see how it came to pass that this created an indeterminate result.

Given two billiard balls of known weights, speeds, and positions... It is easy to plot the past and future path of either ball in an other-wise void. Their positions and velocities at any given moment can be determined by suitable plane geometry lacs. If they should collide, the change of direction, the new velocities and positions are predetermined by their relative speeds and masses, in accord with simple physical laws. Given the masses of both balls, their initial speeds and directions, and the final velocity of either of the balls, the new velocity of the other ball can be determined. And vice versa.

“Let $u_1$ and $v_1$ be the velocities before and after collision of a body of mass $m_1$ with another body of mass $m_2$ moving in the same straight line. Let $u_2$ and $v_2$ be the velocities of $m_2$ before and after the collision. Equating the initial and final moments, we have $m_1u_1/m_2u_2 = m_2u_2/m_2v_2$. The constant of proportionality is called the coefficient of restitution, being expressed by

$$e = \frac{v_2}{u_1} \frac{v_1}{u_2}$$

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If the bodies are perfectly elastic, \( e \) is unity, and the (total) velocities of approach \((u_1 - u_2)\) and separation \((v_2 - v_1)\) are the same.\(^1\)

Applying this to the electron and incident light we find that after the collision there is a change in the velocity of the electron, but not of the light. It is therefore impossible to determine the change in velocity of the electron by suitable substitutions into the preceding equation. Measurement of the “new” velocity of the light cannot help define the new velocity of the electron if the velocity of the light remains constant. Accordingly, direct experimental measurement of the electron is needed to bring us the required information. The trouble is that to make such direct measurements, we must “see” the electron. This reintroduces the original problem though, because to see the electron we must deflect a quantum of light from it, and then calculate from the new light path where the electron had been and how fast moving when hit.

In principle, then, since to be “seen” the electron has to enter into collision with light, and the velocity of the light “remains constant” before and after the collision, the position and speed of the electron in the future or past of the collision cannot be determined. This limitation actually belongs in and to the specific geometrical system used, and to how that system is applied. Since the application is in harmony with the accepted theories of the moment, if both the theories and the geometry do not accurately apply to nature, neither does their conclusion. Nevertheless, this nondeterminism of the precise position and velocity of an electron was generalized into an objectivized principle that nature itself is indeterminate.

It is sadly true that philosophers and savants have placed great weight upon this fallacious principle in arguing in favor of the existence of that most self-evident of all items, free will.

The fact that it seems impossible to complete the simple equation, due to the lack of change in velocity of the rebounding light, led to the substitution of statistics for specific actions at this level. In short, if we can’t predict the exact actions of a given individual, we can apply the results of a statistical analysis of billions of individuals so as to arrive at the probable actions of the individual. From such probable results, ranges of likelihood of action might be plotted. Such a range would represent a “probability cloud.” The electron would then be expected to be somewhere within the cad defined and included within such a “cloud.” In this way, statistical analysis and “probability” wormed their way into physical theory, as though they were a part of nature itself, rather than a loose way of covering up total theoretical failure.

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O. K. Consider these facts strictly with respect to the structure of nature as developed here. Consider that a “photon” is a series of waves, with all the side effects discussed. Consider that the electron can only be a spot of ether with either a positive or negative pressure difference compared to the general pressure (sorce) of the area. When such a node is orbiting on a shell-layer boundary, in response and harmony to and with a nuclear node similarly circulating, that electron is still a matter-wave complex with variable dinsity and inergy around it. When a photon comes by, or a quantum of x-ray energy, the incident energy may be absorbed, it may be re-emitted, it may be transmitted, it may be refracted, it may satisfy a prior imbalance and therefore be absorbed in a manner such that it seems no longer to exist, or it may supply just the right amount of energy at just the proper place to furnish the required shock-wave “energy-of-leapification” that permits an electron to fling off into ether.

Of all these possibilities, indeterminacy stems from the one in which the light does return to a viewer after hitting an electron, and from the added speculation that the speed of light in vacuo is absolute, hence said bounced light’s velocity is “unchanged.”

Eliminating “Indeterminacy”

It is the lack of change in velocity of the incident light that caused all the troubles. “Velocity” is speed in a certain direction. What, then, do we mean by “the speed of light?” To hit the nail right on the head, what indeed is “speed?”

There are several kinds of “speed.” There is a max speed, in which the distance is defined in terms of abstract, arbitrarily constant units of measurement. There is the gas speed, in which the distance traveled between two points is defined in terms of variable measuring units. There is also the speed in terms of densa traversed per unit time, i.e., the absolute speed in densa, or the “abram.”

Which of these meanings does science imply when saying “the speed of light?” If we wish to maintain intelligible correspondence between our language and nature, then we should refer to the abram, when talking about light speed. What, then, is the abram of light??

There are several steps required to arrive at our goal.

1. Given a 10-mile long max-distance, with a medium of ether filling it. If a light passes through that distance in 1 second, and the dinsity of the ether is 22 densa per mile, then the light would have passed through 220 densa of ether per second. If the dinsity increased to 44 per mile, and the light passed through in the same second, then the light would have passed through 440 densa of ether per
second. The abram of the second light would be twice as fast as that of the first, even though they both moved the same 10 miles of max-distance per second.

2. Given a 10-mile max-distance with ether of constant dinsity. First, a condensation-front pulse moves through in 1 second. Then a front of a different color moves through the same cad in 1 second. What was the abram of the two pulses? No, it was not the same. There is a different amount of condensation in each different colored pulse. A different configuration would show up in the graph of the type shown in Figure 36-4 on page 258, for the two pulses. With more inther per pulse of color 1 than of color 2, there is more inther involved per unit time for color 1 than for color 2, when both traverse the same max-distance through a constant dinsity cad.

3. Given two series of pulses of constant inther per condensation pulse-front, but different intervals for the first series as compared to the second. If they pass through the same max-distance of the same ether at the same time, do they have the same abram? No, they do not.

![Figure 37-1](image)

In Figure 37-1 zones 1, 2, 3, 4, and 5 represent pulses of constant inther. There are different intervals, though, between them. The distances between the lines, and the length per line represent dinsity. The shorter the line and the wider the space, the less the dinsity. It is seen that pulse 1 is entering a less dinse space immediately in front of itself than is pulse 2, and that the closer the pulses, the dinser the medium in front of each pulse. Whereupon we find that as pulses approach each other, they are closer to the zone of condensation, hence are entering dinser regions than are pulses that are further apart. Accordingly, there is
a different abram per pulse. If we now enclose the pulses in brackets, we find that bracket 1 encloses two pulses, but bracket 2 of equal length encloses four pulses. Considering the passage of such brackets of pulses through a constant dinsity cad, we again would find more inther involved per unit time when the pulses are closer. The closer the pulses, the greater the abram.

In these discussions we talked about compression fronts moving through a cad. We spoke as though an inther of material bodily moved through the zone. This, of course, is impossible. Nothing can move through a cad at light speed, because at that absolute speed mass becomes infinite and length becomes zero. “Nothing” includes both a photon-particle and/or a wave system.

Remember Einstein. Given that an object really moves through a medium, it must be accompanied by effects which vary according to the absolute speed. The faster the object goes, the greater the pressure in its direction of motion, the stronger the standing-traveling waves inx-rinxing around it, and the faster and further ahead must the exther get out of the way. But there is a limit to the absolute speed at which the exther can be displaced. Signal-transmission energy-boundary-limits exist.

At the maximum speed of signal transmission the conditions discussed by Neil Bailey’s article appear, wherein the entire zone of material ahead of the moving object must be directly warned of the onrush object. (Light speed squared indeed. The speed of the signal that warns of the photons approach is the speed of light.)

At light speed, then, the environment being pushed would be the infinite stretches of the cosmos, wherefore the effective mass of that object would be infinite.

On the other hand, an object is made of continuous matter arranged in patterns by virtue of the energies locked within it, as related to the energies of its environment. When the energy of the environment is altered, as it must be when the object moves through it, then the size of the object will respond accordingly.

As the object accelerates, more resistance is offered. The object would this be under greater pressure from the direction of motion than from any other direction, and that pressure would be transmitted through all portions of the object. We should therefore expect that when absolute motion is a fact, the Lorentz-Fitzgerald contraction would be true. (When only relative motions prevail, as in relativity theory, nothing would result.) In addition to the contraction, moreover, as the pressure-density of the conducting medium’s inx-rinx-standing-waves increase with the acceleration of the object, the environmental physical conditions approach those that create the particulate nature of the object.
At the speed of light, then, the original object would have lost its identity (by having become the same in density-pressure and wave energy as its surroundings), it would have gained infinite mass (through having been forced to move the whole cosmos along with it), it would have reached zero length (through no longer being distinguished from the equally dense ether), and, oddly enough, it would have come to absolute rest (by being fixed in position relative to everything moving along with it).

It thus follows that nothing can move through a medium at light speed, where “light speed” is relative to the immediate environmental matter. It may also be realized that there is no such physical limit to relative light speeds.

Given that a wave energy leaves its containing shell to move through the less dense material of other portions of matter. Given that that wave starts to enter at a speed which can’t be tolerated. What must happen? According to our discussion above, the wave must begin to push the material in front of it along a moving compression front. But a moving bit of material is a particle! Such a particle would admittedly gather all the energy of the wave, but we would no longer have the wave motion. It would have been succeeded by a moving particle.

The particle now finds itself in the position of having to move through its environment at greater than possible speed. It shrinks down to nothing, as it becomes, again, a moving set of waves. But these waves must again become particles which become waves which become so forths. The particles of light have been named “photons.” The intervening waves of light have no name. Because of their stroboscopic, on-off nature I shall call them “strobons.”

We thus arrive at the “p-s” theory that light is an alternating creation of a photon (energy as a moving particle of matter) then strobon (energy as a pressure wave moving through matter), whence light is the essence of motion of the ever renewed creation.

(The photon-strobon theory leads us to expect that the material conducting light will move only when it is a photon, and will move only the distance allowed by the almost instantaneous time interval the photon exists as it fades into a strobon again. The duration of a photon and strobon would vary as the density of the original medium, and as the closeness of the waves to each other. It is even possible that the wave length may represent the distance a photon or strobon lives.)

Cloud chamber photographs of the tracks of some of science’s present “basic particles” always show a beaded effect. It is very probable that the track is an inx-rinx effect in the first place, and that its beaded nature is a demonstration of the photon-strobon effect.
On page 248, Figure 35-2, segment 4 there is a p bracket and an s bracket. These demonstrate the photon segment and the strobom. In all of this rigamarole, that which is actually being transmitted is a pressure impulse, a sorce differential. The interval between such pulses clearly governs the amount of inther involved per unit space-time. Since this amount is the true value, of the absolute rate of motion, it follows that the abram of light can be specified only in wave length. And since light comes in any range of wave lengths, the speed of light is infinitely variable, in principle and in ether.

In all cases involving quantum reactions of incident energies and particles such as electrons, the electron rebound speed depends on the frequency, i.e., interval of the incident quantum, and the wave length (interval) of the rebounding quantum is always greater after collision. When Northrop said that Compton found, with respect to collisions between electrons and light waves, that “in this process the wave itself suffers no decrease in velocity, but merely a decrease in frequency,” he unwittingly stated the paradox at its root. “Merely,” my aching back. (See page 279.)

To solve the “paradox” we had to throw out relativity, revise quantum theory, learn what light is, and most important of all, renew and review the theories concerning the universal ether.

(Certain present-day Pythagoreans are trying to make even motion discontinuously “atomic.” Here is their perfect way. The motion of photon then strobom represents an ever renewed creation of semi-stationary items at successive space-time intervals. A strobe-light sort of thing. Totally limited concept, of course. A ping pong ball has a continuous, though oft erratic motion.)

In any event, the use of wave length as the objectively valid measure of light speed means several things:

1. The speed of light is smoothly variable.

2. Substituting back in the simple equations of page 280, and placing into proper perspective the fact that in the Compton effect the wave length (velocity) of the rebounding light always changes, and in proper proportion to that of the changed velocity of the electron, it becomes easy to precisely plot the new velocity and thus the prior position of any experimental electron. This makes it possible to determine, in principle, the position and velocity of an electron at a given instant. It cancels “the uncertainty relation,” or the “principle of indeterminacy.”

This then removes the reason for statistical analysis and probability equations, with their language and logic-torturing accompaniments. (It was no “probability cloud” anyway. It was a thick, material, layered-shell.)
Let’s do that again. First of all, the change in frequency of the light actually is a change in velocity of the light. A decreased frequency is an increased wave length. An increased wave length means that each wave pulse is further behind its predecessor than before the decrease. The further behind, the less medium being entered per unit time. The less medium entered, the less the absolute velocity.

Hence, we find that the indeterminacy doesn’t even exist, but was “merely” a scientific mistake. You see, if we can measure the change in wave length and frequency of the light after it hit the electron, then we can calculate the amount of energy lost by the light for one, the “new” velocity of the rebounding light for another. We can then calculate the increased velocity of the electron, and then by measuring the final velocity of the electron and subtracting for the increase caused by the light-energy, we have an exact measure of the original condition of the electron. Assuming that electrons really exist, there goes the indeterminacy.
Chapter 38

Analysis Reaches the Needlesharp Point

We often find that when an analysis is pressed far enough the thing being analyzed has disappeared. In terms of the concepts presented to here, though, a very meaningful series of conclusions may be drawn from the analysis even of a space-time point.

At any random point in space and time we always find the following things. First, there is a certain amount of pressure. Second, there is a certain concentration of etheric material. Third, that etheric material is part of some special member of the matter-unit hierarchy, which is in turn part of larger ones. Fourth, in terms of our master Cartesian coordinate system (max) that space time point can be precisely located and its position in the parent units then defined in max, lax, and gax.

In short, at any given point there will be energy, matter, and relation.

There also will be the duality of relation, with the ambiguities and uncertainties intrinsic to mathematics. Even at a point.

The duality is this: There is not and cannot be such a thing as a “space-time point” in nature. An item with no extension and no duration does not exist. Nevertheless, we are perfectly able to arbitrarily appoint one, and even consider the nature of the items present there.

The ambiguity and uncertainty is this: To some degree or other there is a density gradient everywhere. Given the graphline of a variable gradient, we find
that at each consecutive point of the line the slope changes. Every given point has its own slope. But it is impossible for a point to have a specific slope! Analogously, there is a gradient pervading the zone in which our random point struck. There is therefore a gradient at the point. But there cannot be a dinsity gradient, a difference of material concentration, at the same given point. A difference of dinsity requires a slight distance, an interval no matter how slight, to exist.

Yes, the Zeno-esque paradoxes remain an inherent limit to the logical consistency of subjective mathematics. They are not part of objective nature, though.

Let us leave our space-time impossible-point in favor of an even infinitely small circular point. A “needlesharp” point. Yes, now we have our gradient again. We have our inx-concentrations of ether and our rinx-tensions of pressure-imbalance. With such an interval we are ready to re-create everything that exists. But we still have the duality of relation, with the ambiguous uncertainty of the subjective mathematical half. Consider such a dot. During the dot of time in which it existed, ether flowed. Did the dot move with that inther, or did it stay fixed while the exther flowed through. Was the dot a cad, or was it a specific bit of material? At that size level we must again recognize that it is impossible to specify a bit of ether except in general flow-rate probabilities. Such an undeterminate bit of ether does not have a separate, lasting identity. To discuss the bit of ether we must skip back and forth from considerations of the max or gax point to considerations of the lax actions. The two forms of geometrical considerations complement each other, and by suitable manipulations of the two, a full understanding both of location and of the actions at the location can be developed.

Nature and our understanding of it can be absolute even though several geometrical approaches must complement each other to eliminate the uncertainty intrinsic to any single mathematical treatment of materials and energies of indeterminate identity.

After narrowing our field of view into ever smaller zones we have finally reached a pure space-time point. Finding our basic items still present, we nevertheless had to admit that more than such a point must be understood before nature itself can be known. Recognizing that the key items, inx-rinx and a gradient, must exist before differentiation becomes either physically or logically possible, we therefore permitted our point to acquire four-dimensional size, no matter how slight. But now we have passed through the eye of the needle, the hole at the mouth of the cave, and the limit of analysis. Now we have begun a synthesis.
PART V

Cosmology
Chapter 39

Introduction

Thinking never proceeds by analysis or synthesis alone, but they are superimposed upon each other all the time. We shall not attempt to keep them apart as we proceed to develop a new cosmology.

There are two general theories of cosmology which enjoy a wide following in today’s scientific community. The Steady-State Theory says that star systems steadily are evolving and going through life cycles of birth and death. The Cosmic Explosion Theory \(^1\) says that at one moment some ten or so billion years ago all the matter and energy in the cosmos was concentrated into one small spot of space, exploded as a cosmic nuclear bomb, and has been dispersing and disorganizing ever since. Each argument has many proponents armed with the most highly developed and applied weapons of modern science. Using their complex scientific techniques to the full, such proponents advance seemingly invincible evidences that show the one theory correct, thus casting doubt upon the other.

Without entering into long discussion of the two theories, let us immediately pinpoint the real weakness of each. Having done that, we can then proceed to

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\(^1\) Editors Note: This is now known as The Big Bang Theory. The Steady State Theory is now mostly viewed as an historical relic.
make the small modifications that allow the two of them to fall into their correct positions as component portions of the whole truth.

According to the cosmic explosion theory there was a moment in time when all the matter and energy in existence was concentrated in one totally unstable mass at a spot in space. There lies the pinpointed weakness of this theory. It provides no explanation as to how a critical mass so unstable could have come into such a condition in the first place. Neither does it provide any explanation as to how the matter and energy so concentrated came into existence before that, or then. When asked, “What existed prior to the time of the explosion?” the proponents of this theory answer with evasive nonsense, such as, “That is a question that may not be asked,” or “Time began at that moment, so there was no prior period,” or “The human mind poses that kind of question, but nature just doesn’t conform to the human mind, so stop asking silly questions which have no counterpart in nature.” Or they fall back upon a modification of the biblical theory by invoking the help of God, so to have ordered into existence such an otherwise impossible starting point.

This leaves us with the steady-state theory. There are many evidences that star systems of all ages exist right now. Galaxy-large gas clouds have been found. It has been shown these may be the creative mechanisms for stars, galaxies and universes and that such evolutionary cycles are steadily happening. The weakness of this theory is Question 3 below:

1. How long has the universe been existing or expanding?
   **Answer.** Forever.

2. When stars “burn up” what happens to the matter?
   **Answer.** It converts into energy which radiates away into expanding space.

3. If matter converts into energy, and this radiates away into space, and it has been so doing forever, how and from where does new matter appear to form new stars?
   **Answer.** Ulp..Ah... um... somehow matter must spontaneously continue to be created in empty space so as to continue the steady state.
   “Somehow” is not an answer. So this steady-state concept starts with a situation that is either impossible or has no factual basis.

The two possibilities are: Either the raw ingredients of the cosmos have a time of origin or they do not. All existing cosmologies require a time of origin. None can provide a creative mechanism.

The basic items of nature are material, energy, the relations between differentiated portions of them, and the awareness aspect of life. These raw items change their shapes, forms, states and patterns. All items made out of them, whether electrons, atoms or island universes, may be transient. But the basic items
themselves cannot be created nor destroyed. If matter and energy cannot have been created at some moment or moments in time then they must always have existed. If they have always existed, and now fill all the reaches of infinity, then they must so have extended forever. The fact that none of us ever experience any ultimate limits in our routines of life, either in material bounds or temporal extent, should have caused an instinctive rejection of any ultimate limits in our Cosmologies. The continuity of the raw ingredients should have been logically imperative from the first.

I therefore introduce the Cyclic State Cosmology which admits the eternal permanence of the raw ingredients of nature, and then permits the cycles of concentration, radiation and dissolution that matter-units of all sizes continually follow. It admits that the things made out of the basic items have but a temporary and superficial identity even though the ingredients themselves go on forever.
Far out in the depths of cosmic space there is a zone filled with many hydrogen atoms. Each has a spinning nucleus surrounded by a very tenuous material shell. The spin of the nucleus, and the energies spinning and orbiting within it, set up a polarized force pattern permeating the atom and its surroundings. The etheric layers around each nucleus also possess circulating inergies. The pressure of these layers exactly equals the opposing pressure of the nuclei, and the expansive pressures of all these contiguous atoms provide the existence of sorce. Sorce is the outer pressure balance which maintains the atomic forms. The hydrogen filled zone is a gas, out there, and each hydrogen atom is gaseous and shares material, called “ether” with its neighbors. All together form a continuum of matter of varied densities and forces.

This part of the cosmic structure has an overall pressure, a uniform texture, composed of the outer matter of all the atoms. That outer-layer material forms a matrix, an areolar meshwork, a series of fluid hexagonal prisms each of which possesses and is part of a hydrogen atom. The pressure at any part of the matrix is the same as at any nearby portion of the framework, but as one travels far in any given direction one finds that the overall pressures change. The density accordingly also changes. The space filled by this matter-continuum thus has structure and can be distinguished, one part from another.

The matrix is made of the outer parts of the bodies of the contiguous hydrogen atoms, and is never at rest. There are various waves of pressure and density traveling through it, and they are known as “light,” “radiant heat,” “radio waves,”
“gravity,” etc. The atom centers jostle about in response to the changed pressures and densities as these waves pass through.

The area we are examining is made of hydrogen atoms, where each atom has a tiny nucleus and perhaps a tiny first shell, but where the material body of most of the atom extends many feet in all directions, to merge and become part of the body of the next atoms. There is no void.

Off in the distance we see a huge flattened disc of stars. A galaxy. The whole matter matrix at our radius-distance from the nearest galaxy is of a uniform pressure and density, and it forms a flattened spherical shell-layer around the galaxy. We note that there are wave motions traveling permanently through our layer, and that those wave motions are both parallel and perpendicular to the galaxy.

We begin to approach the galaxy. Around the entire galaxy, extending as far as the outer shells of the next galaxies, there are billion-miles-thick shell system matrices made of hydrogen atoms. Each galaxy acts as a huge “molecule,” with many star-nuclei, but with outer shell-layers specific to the galactic unit. The shells increase in pressure and density of matter, and decrease in thickness and hydrogen atom-body size as we approach the galaxy. There is an inner shell of this formation. As we pass through it and into the galactic body we find that there is still a matrix, still hydrogen, still at rest to itself, still carrying the energy waves of heat, light, gravity, etc, but it is now concentrating into shells specific to particular stars and star systems. There is now a complicated matrix structure existing, a huge matrix composed of the outer shells of all the stars of the galaxy. (The outer shells of all the galaxies provide the greatest matrix structure of all, and that matrix is the matrix of the cosmos.)¹ Along the framework of the matrix the pressures and densities are a local constant. The overall density and pressure within the galaxy however, geometrically, albeit in the still the jerky fashion of the shells, increase as we approach the center of the galaxy. The entire galaxy acts as a multinucleated atom, or a molecule.

The local shell-layers of a star follow the same overall pressure-density pattern as do those of the galaxy. Their pressure provides the opposite balance to the expansive pressures of all the component units of the star. If there were no such compensating source, if space were truly a void, there could be no hydrogen atoms,

¹ Editors Note: It is now known that there yet larger meta-level structures and thus larger matrix levels, such as the filamentous and cellular structures of the galactic super-clusters; e.g. the “Great Wall” which spans hundreds of millions of light years. These large-scale structures are in direct conflict with Big Bang cosmology because it is calculated that they would have taken hundreds of billions of years to form which is far beyond the mere 15 billion years postulated for the age of the Big Bang Universe. The age limit of the Big Bang is a mere three times the minimum age of the Earth and it would allow only about four rotations of the furthest known galaxies whose appearance is consistent with galaxies everywhere—at all visible ‘times’ and places in the cosmos.
much less stars and galaxies. They would merely expand to the uttermost physical limits of material expansion, and become homogeneous, structureless ether.

As we approach a binary (or trinary, etc) star system within the galaxy we find an outer system of shells surrounding both stars, and forming a huge molecule of them. Within the innermost such shell we find another shell system around each star.

We spy the sun within this galaxy. It, too, has the shell-layered system around it. That system also has circulating as well as perpendicular wave motions through it. The matter of the shell system is approximately at rest to the sun. The matter of the shell system of each star is approximately at rest to that star. The matter of the shell systems of the galaxies is compressibly at rest to the specific galaxies involved. Although there is local motion within the material of these shells, the entire shell moves with, and is thus at rest with respect to the appropriate nucleus in question. Where the shell systems of similar levels of nuclei meet, the material may slowly swirl in a variable compression ether-vortex. Such a swirling vortical movement can take place in a fluid, but not in a true solid. From a macroscopic point of view the entire cosmos is a fluid. A galaxy, or star system is a fluid. A “fluid” flows. Pressure tends to flow.

Within the Sun System we note that there are ten central layers, in each of which there has been a condensation of some of the shell material into local points, i.e., “electrons,” i.e., planets.

We enter the inner, planetary shells of the solar system, and note the regularity in the relative thicknesses of the shells, as we pass through toward the sun. This mathematical regularity applies to the overall structure of all shells of all levels of matter-units.

We approach the third planetary shell from the sun and see the planet “Earth” traveling within the layer. It travels in a straight line relative to the dinsity of the medium of the third solar shell, thus in an orbit around the sun. So for the other planets. There is a long-term deviation in the planetary path, but whenever it begins to depart from the line of equilibrium of abram and sorce, it finds a terminal velocity pressure dis-equilibrium that causes it slowly to return to orbit. The shell system, itself, oscillates over the centuries, so that the orbits do not remain at the same linear distance from the sun forever. When the shells expand from the sun, the climate of the planets grows colder, and when the shells contract, the climate grows warmer. Such cycles last 20,000 years or so.

There are regular cycles of greatly longer duration, which depend on the cyclical contraction-expansion of the whole star system and galaxies. Throughout the entire cosmos there is mutual inter-dependence, an ebb and flow at all levels, whereby the forces and pressures, structures and balances directly depend upon every level of matter-unit of the entire cosmos. When entropy becomes complete for one galaxy, or even for one universe of galaxies, there must have been a
compensatory change in the force environment at other parts of the cosmos. The outer environment of any galaxy which has completed the entropic action will automatically have altered the pressures upon the huge unit so formed that it slowly, and then ever more rapidly becomes a new nucleus, condenses into a given area, begins to spin, and starts all over again as a galaxy new-born.

We enter the environs of the third planet from the sun. Where we had just been in a solar-oriented layer, we now find ourselves in an earth-oriented configuration. But the material of this shell layer remains at rest to the sun! The passage of the planet through this shell medium causes a displacement wave around it. That wave is actually a traveling density-pressure constant, and it has Earth as its permanent center. All particles of matter (non-hydrogen atom sized), which exist within this shell configuration will always tend to maintain an abram with respect to the dinsity and pressure matrix around them, and thus to move with Earth. In the outer shells, they will actually be moving through the shell matter, which will act as a continuous ether to them, and will find it impossible to maintain their own own ether shells, except as traveling waves local to themselves. They are called “ions.” The matter of their shells does not belong to them.

As we approach closer to Earth, the number of such particles (atoms) steadily increases, until they are so close to one another that there is no free ether left. They are no longer traveling through a medium which is at rest to the sun. They have actually become a contiguous-continuous medium themselves! They are at rest to Earth. They form strato-atmospheric shells around Earth, and those layers come right down to the surface.

Let’s detail the changes found in going from interplanetary space into Earth’s surface air. We start with an amorphous ether, with a number of nuclei far removed from one another. The nuclei move through that self-stationary though fluid and compressible ether. Each nucleus creates its own standing-traveling wave series around itself. The ether thus is filled with inx-rinx waves, but remains relatively self-stationary except for those waves. The hydrogen atoms so formed do not possess fixed identity.

Those atoms are made of discrete nuclei (one each) plus a shared exther field. That kind of atomic set-up would provide the closest existing example to the conditions theorized by the kinetic-atomic-plus-ether concept of classical physics. But that atomic structure only exists in the rarest, most dilute gas state of matter! It doesn’t apply to dense gases, since they convert the cad ether into a gaseous inther cloud.
But we’re getting ahead of ourselves. Back to our kinetic nuclei through a self-stationary exther. What happens when we add a lot more nuclei to our volume of ether? (More nuclei in the cad.) When there were relatively few nuclei, each wandered around almost independently of the others. Each one of them caused an increased dinsity of the immediately contiguous ether, a dinsity concentration that decreases with the square of the distance from the source. A gradient relatively unnoticed by the other nuclei. But when they are close together, still inertial, still possessed or their given abram, then they more readily run into one another’s dinsity effects. Since the abram is absolute with regard to the dinsity of the medium traversed, the nuclei now begin to veer toward each other. They are “attracted.” At the same time, though, the standing waves begin to interfere with each other.

Within the cad area this represents a fascinating development. The free ether is no longer free! Although there is still a microscopic turmoil among the standing wave shells, if we assume a macroscopic point of view we note that the entire ether area has physically entered into the vortical motions of the waves. Since the waves are really local moving matter configurations, it follows that when we get enough of them into a given volume, all the material in that volume will be moving. There is no “self-stationary” ether left!

There are now the conditions found in an “ionosphere.”

We add more nuclei again. Instead of a very few atoms moving through a continuous self-stationary ether we now have a number of nuclei moving in a medium which already moves in a multitude of different directions, where the direction at any given point depends on the status of the nuclei around that point. The picture provided by ether-theory-classical-physics has ceased to exist. The picture provided by modern theoretical physics, with its huge amount of nothing, never did exist. The picture provided by Einstein’s relativity mathematics, though, is rapidly developing. The “curvature of space” in response to local matter-units therein is rapidly assuming that state of complication to which Einstein once referred.

But there are compensations that make understanding easier. Since by now we no longer have a free ether with atoms moving through it, what do we have? We have a number of nuclei, around each of which there is a configuration, made out of that ether, a configuration which now begins to travel with its nucleus. In brief, the material of the shells begins to travel with the nucleus, and the atom has begun to acquire identity. The matter of the shells is beginning to move with the nucleus, and the whole item so formed is an atom, matter-unit one. The collection of such atoms is called a gas. (At earth level, there is no self-stationary ether left to flow through the “spaces” between atoms, even if there were such spaces. Since there
really aren’t any spaces between earth-level atoms, it was the material of which this “atmosphere” of contiguous atoms are made that conducted Michelson and Morley’s light.)

As said, the outer limit of each gaseous atom of the atmosphere is a surface tension shell, and the surface tension shells of all atmospheric atoms are joined into a contiguous-continuous matrix. The tension and pressure of that matrix is a local constant, but varies with the distance from the center of the matter-unit (Earth, in this case). The density-pressure of the Earth-oriented matrix is, in turn, related to the matrix of the solar shell matter, which is related to that of the nearby stars, which are related to that of the galaxy, the universe, the cosmos. Were the source pressures of any higher level unit to which Earth belongs to drastically change, Earth could not remain as a solid-shelled unit. It would evaporate.

The matrix of the atmosphere provides sufficient source for the existence of liquids and solids. When a solid hollow object is “evacuated,” the gaseous matter is removed. That gaseous matter can be removed until the source pressure of the atomic matrix has reached the minimum required to provide a compensatory equilibrium against the expansive atomic pressure of the solid itself. At that point, if further evacuation is tried, the surface atoms will evaporate out of the solid to maintain the huge, but unmeasurable source pressure within the “vacuum chamber.” At all Earth-gax points equidistant from the center of Earth, the amount of pressure remaining in such a “vacuum chamber” will be the same. A medium within such chambers will approach a “perfect vacuum” of the same pressure and density of matrix, anywhere on Earth. The maximum speed of light through such chambers will always approach the same maximum, but that maximum is only constant under earth level environmental matrix conditions. As we depart from the sun, and out of the galaxy, the force matrix decreases in pressure and density, and the speed of light varies accordingly. In fact, it does so even as it passes across and through varied shell systems, regardless of which matter-unit is involved.

So we find that the entire cosmos is involved in the continued existence of the planet Earth. By virtue of the pressures and motions (particulate or wave) of the immediate environment we find smaller, molar body matter-units on Earth. We find sticks and stones, puddles and oceans, bricks and people, animals, plants, and minerals.

Each such unit possesses identity, as delineated by the intervening otherness (air, liquid, even at times other solids) which surround it. Within these matter-units there are no empty spaces. The molar body will conduct wave motions
through itself as does any continuous whole. The wave motions will be “steered” by the gross configuration and density of the matter-unit, rather than merely by each component inner unit.

Although the matter of the atoms and molecules of a solid may almost be at rest, there is always the wave motion, which maintains their form, still moving. The matrix of a molar body matter-unit is solid, when the unit is a solid. That matrix, the joined outer shells of the component structures, limits the degree of smallness into which the unit may be broken without losing its existence. So long as the object is broken without changing the internal energy relation it will remain a molar body unit. When the matrix is down to a size where individual atoms or molecules are exposed, the matrix will return to an outer, surface tension shell layer. When a solid is broken, the surface tension layers will immediately form on the free surfaces, and the solid can not be reassembled without first having at least the opposing surfaces melted.

When a molar body solid is melted, it becomes a liquid. The matrix remains present, but in fluid form. The liquid, itself, is now a molar matter-unit, in which overall wave motions (energy) flow. The liquid will always tend to assume a spherical form, with density rings, a nuclear center, and a surface tension layer. All of the smaller units which make up such a molar matter-unit will take part in the formation of these rings. They act as a continuous ether. A gas will tend to do the same, if isolated in space, but, being gaseous and possessed of a gaseous matrix, will allow the nuclei (atoms and molecules) to wander more freely than in a liquid. We shall soon discover how and why.

The shells, tropopause layer(s) and the nucleus of an atom or molecule are variable in their relations to themselves and to other such matter-units. Depending on the amount of intrinsic energies the shells will either be firmly attached to the nucleus, as tropopause layers, or loosely attached to the nucleus while still moving bodily with their nucleus, or so loosely held as to be standing-traveling waves with variable amounts of almost freely moving ether between nuclei.

These matter-units, in other words, are solid, liquid, gaseous or ionic. The ionic state is unique, in that the matter-unit may still be either gaseous, liquid, or solid even though it has lost some of its outer shells and become ionic. An ionic matter-unit is one which does not have the matter-energy shells required to provide equilibrium conditions within the matter-unit itself.

The difference between the three states of matter is one of ownership, and relative density of the material of the shells of atomic and/or molecular units, where that difference is in response to different amounts of intrinsic energy.

The component parts of an atom are not matter-units. They are energy configurations (motion and pressure) which cause local matter configurations, but in which the material does not necessarily travel with the energy.
The molar body matter-unit is made of molecules and/or atoms. If it is liquid or gaseous, so are its constituent members and so is the matrix. A solid object can easily move through such a medium, merely by displacing the members, penetrating through the matrix, and causing the medium to flow around it, or be compressed. That “absolute space,” void, is necessary to provide identity and allow change of place is purely untrue.

The molecules are another level matter-unit. They are made of atoms which have merged their outer bodies, rather than just share a matrix-forming outer shell border. The atomic nuclei still persist in the molecule, but some of the material of the outer shells has joined to form new shells around the entire molecule. The molecule is similar to a binary, etc star system. The physical properties of a molecule depend on the overall structure, forces and amount of matter of the molecule. Those properties are independent of the constituent atoms, except insofar as they are the resultant of the amounts of matter and force the contributing atoms contained. The molecule is not merely a connected bunch of unchanged atoms, it is something entirely different. It is a multinucleated atom.

The matter of which the atom is made is what we have called ether. It might, perhaps, have been enough to simply call it “matter,” had not modern science so badly distorted the meaning of that term. The ether which forms the material body of an atom is compressible and expandable, conducts wave motions called energy, and is continuous in the shells of the atom, as well as within the nucleus. It is highly probable that the nucleus is also of a shell system nature, with a clear, homogeneous, continuous center. The matter which comprises those shells can, like an electron, condense or be caused to condense to a given spot, and thus become a particle.

The atom has several different faces. It is not the hard solid of the Greeks and Newtonians. Nor is it just the vortex of Descartes. It is not the electric charges moving in the void of present theoretical physics. What it is depends on where it is and how it is situated relative to its environment. It is a variable. It is variable in size, state, properties, etc. It is both a unit and part of a larger unit. It is both a continuum and a gradated thing of many parts.

There is, to and in the atom (or any other matter-unit), a material part, a geometrically formal pattern, an energy content, and a cause-and-effect relation between itself, its parts and its environment.
It is also a space-time continuum. A curved one. “Curvature” stands for the variable dinsity. “Space” stands for the matter of which it is made, and which possesses that variable dinsity. “Time,” which actually is a substitute in Relativity for “light,” represents the travels of wave energy. It would be wise to substitute “wave energy” for “time” in the “curved space-time continuum,” and the proper other words in their places to find that the ultimate truth of the conclusions of the General Theory of Relativity is that there is a graded variation of dinsity to the matter of any matter-unit, and an inx-rinx configuration that causes variations in the direction and speed of conducted wave energies.
In our review of the matter-unit hierarchy we now come to the atom. The atomic level merits a full chapter because the mechanisms of attraction and repulsion find their explanations here, in the refractions and reflections of wavicles affected by local matter-energy configurations. Such configurations consist of the inx-rinx as inergy-inther fields and as exergy-exther fields that permeate any component of a conduction medium.

Figure 41-1 shows a curve representing the rate of change of concentration of ether (the “gradient”), following the square of the distance rule in response to sorce-Venturi effects. It is a regular curve, with several important distinctions. First with every unit distance further from the source, the amount of change is less, even though the rate is the same. Second, the dinsity approaches zero at infinity. (We shall soon see that this is most significant.) Third, the curve is very steep, at first, but steadily flattens out with increased distance. If we draw tangents...
to various points along the curve we find that the slope of those tangents (the slope) similarly becomes steadily "flatter." The closer to the source, the steeper the slope of the gradient curve as the concentration more rapidly increases.

Conversely, the further from the source, the flatter the slope as the density-source gradient approaches --- ? What limit does the decreasing density and lessening source-differential approach? No, it is not zero. It is the cad matrix value! The minimum cavity density.

A quick review of the spectra of solids, liquids and gases is now in order. The spectrum of solids and liquids is continuous, which indicates that the gradient curve is continuously variable. This indicates that the refractive energy-matter concentration on the cadmatrix is not constant, but instead varies toward and away from a minimum as one moves from component unit to unit, i.e., the gradients overlap. The discontinuous band or line spectra of gases indicates zones of constant concentration between units, i.e., a relatively broad non-refractive interstitial matrix of approximately level minimum concentration.

In such gases, then, there is a general background energy-matter concentration. That is the cad matrix value. And it is the limiting minimum that a gradient can reach as one departs from a unit. The gradient slope in the matrix of such gases is thus zero. No gradient. The matrix slope for liquids and solids flattens out to a zero point at the matrix line, then achieves increasing value in an opposite direction as one approaches the next unit. See Figure 41-2.
It is seen that overlapping gradients will add vectorially. Accordingly, slopes of the same direction will sum up to a steeper gradient, while slopes of opposite direction will cause a flatter net gradient.

When a pressure pulse or moving particle enters such gradients, its path alters. The steeper the slope, the sharper the curvature of the energy path. We might frame this as a law of motion. In obedience to the requirement that energy is indestructible, it would go like this:

A Law of Motion: Unless converted into pressure, the abram remains constant. Accordingly, the paths of traversing items will curve according to the gradient of the traversed medium. If the gradient is a regular one, the curvature will be regular. If the curve of the gradient is irregular so will be the path of the traversing energy.

First Corollary: The amount of refraction is a function of the slope of the inx-rinx sorce-ether gradient, all other things being equal.

III

From pages 47 and 48 of the book “The Neutron Story” we take the information that as the speed of a sub-atomic wavicle -increases, its wavelength
decreases.\footnote{Donald J. Hughes, “The Neutron Story,” pp 47-48. Doubleday and Co., Garden City., New York, 1959.} Also, as the wavelength decreases the wave takes on the properties of a particle. And vice versa. (The photon-strobon effect accentuates.)

Our previous investigations found that the p-s interval of radiant energy decreases (max-wise) as the density of the conducting medium increases. This means that the “waves” steadily get shorter, and effects more lastingly particulate, as the density increases. Accordingly, in very dense media, waves must convert into particles. (A wave is a configuration moving through exther. A particle, though it might possess the identical configuration, moves with its own inther. There must, then, be a “critical dinsity” in all units, above which wavicles become particles. See Figure 41-3 below.
Figure 41-3.
Figure 41-4.
In previous chapters we saw how rotations of a nuclear core, plus circulating inergy nodes within it cause an increased dinsity around said nucleus. We also saw that the nucleus must shrink and condense enormously increasing its rate of spin and compensating dinsity as this happened. We then saw that the inx-rinx effect would create layers, of variable dinsity superimposed on the regular square-of-the-distance rate of dinsity decrease in that circum-nuclear cloud. Similar effect must take place within the nucleus, for the same reasons. The circulating nodes, plus the decrease of sorce-pressure at the spinning nuclear interface (via the Venturi effect), will cause the inther to condense toward that surface so as to create a reverse, accentuated image of the shell-layers. Accordingly, we expect that the nucleus has a central vacuole with a minimum intranuclear dinsity-sorce value, surrounded by an extremely steep gradient that attains maximum intensity at the limits of that nucleus. (See Figure 41-4.) The nuclear boundary limit is “the interface.” It is a very high dinsity barrier which delineates the nucleus. The sorce-ether concentration at a nuclear or wavicle center can be equal to, greater than or less than that of the cad matrix. It is probable that the nuclear center and the cad matrix have equal concentrations because sorce must ultimately equalize on both sides of the interface. It is possible that the lack of such an equilibrium between core-centers and the cad is the cause of positive and/or negative “charge.” (It is also possible that the nucleus may be dinsest at its waist, since that is where the spin creates the fastest linear speed, thus the strongest Venturi effect. If so, the nucleus should be shaped like a dumbell, with all internal circulating inergies orbiting within the dinsest torus-zone at that waist. The torus-zone, in turn, might rotate like a curling smoke-ring, following the right-hand rule as to direction. Or it may be that the nucleus is an ovoid with internal shell-layers containing orbit-following particles analogous to the external shell-layers. The internal and external layers are possessed with oppositely directed gradients, hence oppositely spinning nodes.)

In the event that the nuclear center is equal in concentration to the cad matrix, or even if not, the gradient from that center to the very minutely distant nuclear boundary must be fantastically steep. As a result, the local refractions and reflections similarly have to be fantastically abrupt.
V

Figure 41-4B is a gradient curve, providing a graphic representation of the changes of density concentration, i.e., the inx field, of that atom. The shell-layer variations of gradient are superimposed on the regular, square -of -the -distance curve, demonstrating once and for all that the gradient always possesses the equivalent of a wave structure.\(^1\)

At the nuclear section of the gradient curve we see a very deep, steep “nuclear well” The sides of that chasm show the various plateaus analogous to the shell-layers outside the nucleus. The various electrons, protons, etc., orbit or resonate on or between such inner or outer plateaus. The “critical density” zone for that atom, with respect to average wavicles, is also indicated. Above it, the increasing-density, decreasing-interval relation converts waves into particles. It is probable that the exact value of the critical density point varies for different speed and strength pulses, but since the nuclear barrier gradient is so severe, such differences of value must reside in a narrow band of that barrier.

VI

A sorce-pulse will penetrate any material and though it refract according to the curve of the traversed gradient, its inx-rinx effects will penetrate even further. But not a particle! No, a particle of inther will penetrate a less dense material than itself, as a pebble moving through air and/or water. But a particle reflects as soon as it reaches a denser material than itself. It is pushed out, turned aside bounced. Like a bubble of air striking a lake-surface or a rock. Like Michelson and Morley’s ether bouncing back from the walls of their chambers.

The wave will refract toward the zone of greater density, hence will approach the highest density region. That region is at the nuclear surface, the “interface” between nucleus and outside shell-layers. A particle, though, will reflect away from that denser interface. It will do so whether it is inside or outside the nucleus. Accordingly, when a nuclear node (proton) curves toward the interface it passes through the critical wavicle line and becomes a particle, which turns back toward the nuclear center, again passing through the critical line and then reconverting into a refractive wave. So for electrons.

\(^1\) Many arguments that I have had with myself over the question as to whether the gravitational field acts as a pure gradient or as a wave system were ultimately resolved by this fact, i.e., all gradients have a wave-structure macroscopic configuration.
Yes. It is refraction and reflection. As a nuclear wave-node refracts toward the interface it “strobons.” As a particle, it reflects. As it leaves the high-density inther it pulses back into a refracting wave system. And it does this forever. Or at least as long as it is part of an atom. Photon-strobon, electron-strobon, proton-strobon, refraction-reflection.

Figures 41-3 and 41-5 show the path of a nuclear node as it is alternately refracting-waves then reflecting-particles. The fact that protons stay within the nucleus in spite of mutual repulsion, while electrons stay outside of the nucleus in spite of protonic attraction, re-enforces the decision that the internal nuclear gradient is a (much steeper) reverse image of the outside gradient.

These gradient effects agree with the mathematical curve for “nuclear force” in present physics. Indeed, this mechanism must be precisely what “nuclear force” actually is!

Every time the particle bounces away from the barrier it will acquire a spin in the opposite direction to its orbital path (like the wheels of a landing aircraft). In short order the rate of spin should equal the rate of linear motion. When the strobic particle converts into a wave system again, the system might surrender the spin into the inther, creating inergy tensions. If the wave system continues the spin it would acquire lasting identity because of its own Venturi effects. (Since wave systems are independent of the motion of their source objects, but are propagated under the physical control of their conducting media, the waves probably don’t spin.) While a particle would normally refract in a gradient in exactly the same way as a wave so as to maintain the abram all across its breadth the spin will tend to neutralize the gradient effect and allow a straight unrefracted
path for the particle. So while the wave refracts as though to leave the nucleus, the particle first straightens out, then is reflected when it finds its entered medium denser than itself. Actually, any wave energies that barely penetrate the barrier would find themselves in a reverse gradient, and should turn back again to curl back and forth through or against the barrier.

With respect to “tunnel, effects,” i.e., the penetration of a high potential barrier by energy waves of insufficient strength—remember that such a barrier is only a high-density layer at the nuclear interface. If the barrier is very thin, relatively low energy particles may pass through it before being slowed to a stop by the greater density of the fluid barrier. Should the barrier be thicker, as it would in heavier nuclei, only particles moving with relatively greater speed (more energy) can penetrate. Once through a barrier, of course, the particle enters a decreasing gradient, is expelled outward through the critical density, or it critical wavicle” line, wavicles again, and sets up an inx-rinx radiation outside the nucleus. If it has sufficient speed to escape the steeper sloped, area, it will find itself leaving its gas and entering the lax at oblique angles. It might easily then acquire a strong spin, thus a particulate identity.

Conversely, the exergies passing through any cad must set up inx-rinx effects that will penetrate and be trapped inside of the nuclear barrier. Accumulations of energy must therefore occur in all nuclei, as a balance is reached between energy being stroblishly released and energy from such releases by other atoms being inxrinxically captured. (Remember that secondary forms of energy can be gradually accumulated by matter units, within boundary limits, only to be re-emitted as quanta of a different secondary energy when those limits are surpassed.)

For quantitative purposes it is necessary to specify the relations between many factors of the cad and of the responding units. For the cad, the factors include the density of the ether, the value of sorce, the field gradient of the matrix, the effect the unit’s inx-rinx actions will have on that matrix, the amount of curvature of inergies, the slopes and intervals of all cad gradients, the relations of the contained units to each other and to the local portions of the matrix. For the unit involved the factors include the amount of inther and inergy, the rate of spin, the Venturi reaction as to final size and dinsity (which depends on the cad factors as well as those of the unit itself), the interval of the unit’s inergies and the effect the cad will have on them, the amount of curvature of such inergies, the resonance requirements for equilibrium between the internally orbiting wavicles and their shell-energy requirements, and the directions of motions relative to cad energies and dinsities.
VII

In media of a given matter-energy concentration “ultimate particles of only certain sizes can persist because: (1) The ultimate circumference of the node is a function of its rate of spin, and of the rate consequent sorce-decrease, and of the rate of consequent dinsity in crease required to compensate for that sorce-decrease. A size is reached at which the increasing dinsity requires more pressure differential for further compression than is introduced by added spin, that cad. (2) The ultimate circumference must be such that the internal gradient-slope is able to cause appropriate patterns of curvature of all inergies. (3) The orbital paths and speeds of the internal nodes must be such as to harmonize with their own inx-rinx resonances criss-crossing within that particle. (4) The slope, and consequent resonance depend on the diameter, circumference, and dinsity. Wherefore the size of the particle must fall within the mathematically exact limits that will provide such relations. Indeed, the nodes within such particles also must fall into mathematically harmonious limits so that their curvatures, critical dinsities, inergies, and sizes will hold them in orbits within the matter-unit configuration thereby help create.

Since the shell-layers are either repeats or doubles of each other’s, thicknesses, we might discover that the nuclear and circum-nuclear resonance waves also repeat or double each other in amplitude. If such affairs spin into particulate forms, such as electrons and/or protons, it is quite possible that electrons, protons, photons, etc., can come in whole number multiples of size and mass. If so, the electron and proton now theorized may be only the smallest ones.
Figure 42-1 represents a few adjacent nuclei at varied distances apart in a common cad. Each unit spins, thus has its own source-equalizing -density gradient. As you study the drawing imagine that the nuclei are mobile, and move closer or further. See the densities change? The slopes alter? The pressures vary? Imagine that the rates of spin also change. Note that when the spin increases (so as to remain constant relative to its local gas) Venturi effects sharpen and gradients therefore steepen. This requires either, or in the absence of same creates a relatively negative pressure, i.e., a pressure below normal cad source. If the spin slows, inther can inx. Or the pressure can increase. Or both. As you imagine such changes of spin and relative positions keep in mind that the gradient changes represent material density and pressure changes. The rise and/or fall of the \( P, Q, \) and \( g \) lines represent pressure and density changes moving about in the cad. Such actions are the embodiment of wave systems. Watch them move about, in your imagined picture. You will soon feel and understand the dynamic fluidity of what should rapidly become familiar to you as the actions of heat. Heat as both waves and unit-portions moving in water or any other continuous liquid or gas. As you see the various nuclei moving about within their own shells, condensing and rarifying the material around them as they do so, you will understand the heat mechanism responsible for Brownian Motion. It was not solid, spatially separate, pellet-like molecular particles bouncing bodily against the dancing Brownian particle. It was a complex action with variable density, variable pressure shells and moving zones of denser material nuclei causing changes in said shell systems, in the cad matrix structure, and even occasionally hitting the Brownian particles.
directly. It was liquid molecules in a liquid matrix with no empty spaces, that held the Brownian particles in an erratic suspension. When the Brownian Particle asks, “What the hell goes with the ether, the sorce and the gradients?” you just answer, “They beat, Man. They pulse. They vibrate. They are a dynamic equilibrium.”
Figure 42-1.

Line A represents absolute density in densa per unit volume.
Line B represents distance in any constant value units.
Line C represents the value of sorce in pounds per square inch.
Lines E, D, F, and H represent the axes through respective nuclei, which spin on such axes.

Line P represents the average cad sorce pressure.
Line Q represents the average matrix density for that cad and that P.

Line G₁, drawn ——, represents the normal gradient a unit would have under the average cad P and Q conditions.
Line G₂, drawn ——, represents the resultant gradient that will exist because of the overlapping fields of adjacent nuclei.

○ represents the normal situation of an isolated nucleus.
○ represents the nucleus in equilibrium, with adjacent nuclei.

When nuclear spin increases, written ∫+, local sorce decreases Venturi-wise, and inx occurs. This causes a steeper gradient, a higher nuclear density, and the influx of exther. In the event that exther is stopped from inxing, a sorce deficiency will persist. And when spin slows, ∫-, the reverse occurs, i.e. exther-inxes and sorce increases. Accordingly, a plus or minus pressure may occur in the matrix areas, with respect to P, Y and -Y represent such conditions.

On axis A the value of the Q line is taken as zero. P caused Q variations above that value are shown in plus numbers, variations below it in minuses.

(Note that the minus numbers are smaller as we depart from the Q line. That is because the absolute density still declines, with an absolute lower limit of zero. There is no known upper limit.)
Before proceeding with the study of the mechanisms of gradient slope variation, let us elucidate the extremely important consequences of such slope variations. Previous chapters developed the idea that the steeper the slope, the sharper the refractive curvature. The sharper the curvature the tighter the turn. Look at unit F, in Figure 42-1. An inergy that orbited regularly in the normal $g_1$ gradient must follow a tighter curve on the steeper left side, and a lesser curvature on the right side in the $g_2$ gradient. A circular orbit that sharpens on one side while decreasing curvature on the other has become a spiral. The spiral moves toward the side of lesser curvature. Which means that the inergy is there by caused to spiral toward the side of lesser slope. Naturally, where and when the inergies go, so go the inthers. Where the inthers and inergies go, so has the matter-unit gone. Accordingly, whatever causes the slopes to grow steeper on one side than on the other will so have caused “attraction” to the lesser side, or “repulsion” from the steeper side. Attraction and/or repulsion ultimately are merely refractions and/or reflections.

It is seen that inergies will spiral away from point one, in the adjacent units. But note that they do this only in response to a change in the orbital paths within their own matter-units. Any exergies that enter the unit will refract towards the zone of greatest density, paying no heed to the variations between slopes on different sides of a given unit. Exergies will therefore tend to concentrate in denser regions even though matter units may be refracted away from such regions under the special conditions described for a gas.

It is important that we here recognize the role of absolute density in these reactions. While the amount of curvature of traversing items depends on the gradient, “all other things being equal,” there are conditions where all other things are not equal. A gradient of 6 degrees in a medium of dilute density cannot have the same effect as will a 6-degree gradient in a very dense medium. It is highly probable that the amount of effect will increase, in harmony with the Lorentz-Fitzgerald contraction equations, and that this is the reason why those equations were found to represent accurately the actions of real things.

Accordingly, the strength of reactions to gradients will Lorentzianly vary as does the absolute density of the medium. The forces of attraction and repulsion will thus be greatest where the densities are greatest.
III

The factors that can cause changes in a gradient are the rate of core spin (whether that core be a planet, star, molecule, atom, or proton), changes in the absolute quantity of ether in the cad, changes! in relation between units in that cad, or any motions in or through the cad that can cause such changes.

We shall now study these factors one by one, alluding ever to Figure 42-1, for clarification.

Phase One: Spin Changes

If equilibrium conditions prevail around a given nucleus, then the density decreases with the square of the distance from it and sorce holds constant. Reversing the statement, we find that the density increases exponentially as we approach the nucleus.

If the nucleus increases spin (as in axis E) exther must inx into the matrix and into the shells. In the event that exther is blocked from entering the cad (as it is if solid walls intervene, or if diner material is in its way) then local sorce decreases follow. A sorce gradient occurs. The slope of the sorce gradient varies thus: The less the available exther, the steeper the slope, in an opposite direction to that of the ether gradient. If insufficient exther is available this creates a sorce imbalance, hence an extremely unstable and transient condition. Ultimately there is always exther available, or changes of size, state, matrix ether-patterns, or even level of organization may occur to re-establish equilibrium conditions.

If the nucleus decreases rate of spin, -inx [negative inx] follows. Local sorce increases expel inther and increase the Q level as well as the P value.

A long time ago we developed the concept that heat waves travel back and forth through the molar body, traversing the atomic and molecular components as though they were its conducting continuous ether. Studies of the motion of portions of water as an ocean wave passes show that such cads (small portions of water) move in circular rotation as the wave transmits. Analogously, “heat” causes the circular motions of the component portions of the transmitting medium. The “stronger” the heat waves (hotter), the shorter they are and the stronger the response. Wavelength plays its role, now, in governing the nature and size of the response. When the waves get short enough they find their interval and gradients within the shell-layer systems of individual molecules or atoms. The circumference of rotation diminishes, until it is the size of a molecule or atom. Whole molecules and/or atoms thus assume the circling motion, hence take on added spin. Or else, the heat waves find themselves bodily contained within shell-system gradients, to orbit themselves, within such refractive media.

We repeat. The radius of the circles around which component units revolve as heat waves transmit is a function of the interval of those waves. As the waves
shorten, and the object “gets hotter,” the circles get smaller. There comes a time when each given unit just spins on its own axis. Each different sized atom or molecule will thus have specific temperatures and pressures at which the intervals and unit sizes can create such spins.

Be the nuclei whole molecules, atomic parts of molecules, whole individual atoms, or atomic nuclei, when this happens the whole mechanism of nuclear formation and condensation comes into play. The attainment of that temperature at which the interval causes spin instead of bodily circular orbiting creates the unit E condition. The greater the spin the dinser the nucleus, the steeper the gradient, the smaller the radius of the nucleus and the circum-nuclear shells, but the wider the matrix layers, and the weaker the overlapping effects of adjacent gradients.

Once the temperature is such that the heat-wave interval causes bodily spin of units, sudden changes of a new kind must follow. Instead of continuing the jostling about in ever smaller and faster patterns as more heat is added, new effects occur with respect to each unit. Increased spin means decreased local pressure, which causes inx to each unit nucleus plus a steeper gradient. But inx requires ether. The cad matrix is the only immediate reserve of such ether. Take some toward unit E and you leave less both for the matrix and for unit F. This again accentuates the slope on the point 1 side, creating the -Y condition.

So! Adding “captured heat” (spin) shrinks the nuclei, increases the gradient slope, widens the matrix while decreasing the absolute density Q, and thus steepens the gradient on approximating sides of adjacent units. Since inergies spiral away from the zones of steeper gradient, such units will thereby be mutually “repelled.” (!)

It has become evident that unit E is a gaseous unit, and that we have now begun to determine the physical actions by which energies convert from one secondary form to another, and matter units from one state to another, and from one level of organization to another. For instance, in Figure 42-1 we find that unit E is a gaseous unit. Units F and H are liquid atoms which attract toward each other, and have an outer “surface tension” gradient facing unit E. At point I I I between units H and D the gradient overlap effects have summed to a total greater than each alone, and a dinsity peak has been created. Here is the appearance of a barrier gradient that condenses the matrix, and all components locked within it. A “solid.”

Far back in the book we had stated that energy is the cause of difference in the state of matter. We had developed the thesis that such differences of state are intrinsic to each and every component unit. We now see that while this is so, unexpected complications arise.

The ether and sorce of the matrix, all three of which are unknown to present science, have begun to assume the dominant role. We see that in a gas the nuclei are more compact and discrete, their gradients reach more precise limits (the cad Q level) without having touched, and that from the point of view of shell-layers
and gradients the unit centers are dinsel, i.e., more solid and more particulate, and have greater identity than in comparable solids or liquids. Indeed, the dinsities of (1) the matrix layers and of (2) the nuclei and inner layers vary inversely as we add heat. It is therefore the matrix itself that provides the essential difference between solid, liquid, and gas states of matter and that enters into gradient slopes so as to establish either attraction or repulsion direction of refracted inergies per unit.

We now resume our discussion of adding heat to unit E. If it had been a liquid component of a liquid prior to the diagram moment, the pi plus action (spin) has converted it to a gaseous unit. In that process, shorter waves of “captured heat” have been locked into the shell-layers as point I I slopes suddenly snapped to point I slopes, with severe shock changes of inx-rinx, P, Q boundary limits and shell size values. Since “captured heat” is found within the shells, affecting nuclei inside of molecules and even atoms, it is evident that we have left heat and found chemical energy. “Captured heat” was chemical energy, and the added motion had been used up as chemical energy altering spins, unit relations of distance and slopes, and yielding a by-product of changed intra-unit attraction, even unto repulsion, with consequent sharp increase of pressure. The newly enlarged matrix layers much less dinsic than between the liquid units F and H, can now absorb heat all over again. As they do, and the fine waves travel around the matrix, the nuclei will bounce harder and faster, creating very nearly the conditions postulated under the existing kinetic theory of heat. In fact, we have just elucidated the mechanism by which the added heat is used to “overcome the molecular attraction” during transitions of state with no change in temperature as energy of vaporization is absorbed.

We thus unexpectedly find that in a gas, all the units repel each other. ¹ The closer they are the stronger the repulsion, since the gradients steepen accordingly. We should expect then that a gas should increase in pressure as it is pushed into a smaller volume, that added heat should increase the repulsion, thus the secondary pressure, that a gas should always expand to fill a given space, and that gaseous units of different slopes and sizes should—by virtue of their similarly different strengths of repulsion—flow into equidistant relation with one another. All of which is so.

It is time to point out that in the conversions from solid to liquid to gas, energy converts from heat to chemical, to electrical, etc. If we wish to name categories into which the spectrum of inx and rinx can be divided, if we wish to establish secondary forms of the two primary forms of energy (motion and pressure), then

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¹ If the universe acts as a gas, all the nuclei (stars) should repel each other, and the universe might therefore appear to be expanding.
we again find that wave interval and slope are the ultimate difference in that each matter-unit level reacts only to appropriate size ranges. Furthermore, the different ranges of wave systems require the presence of such various levels of units to elicit reactions.

Consider a stone, made of molecules that are made of atoms that are made of material containing wavicle such as electrons, protons, etc. There are certain inergy waves resonating and inx-rinxing within that stone, with an interval such that the molecules combine bodily in the, promulgation of each wave. Whole molecules take part in such circling actions and when the circles get small enough whole molecules begin to spin. When these wave intervals get even smaller they find themselves fully containable (as exergy) within a given molecule. To these smaller, “hotter” heat waves the circling medium is now partly made of the molecule’s nuclei, i.e., the atoms.

When the spectrum has shortened to fit within atomic shell-layers, attraction wanes, and may even become repulsion. Molecules widen, as their atoms take on a spin and shrink, thereby entering into a $\square +$ phase and decreasing the dinsity, unit identity, solidity and stability of the matrix layers. Since said matrix layers are actually the outer shell-layers of the molecule itself, this event ends by destroying the molecule altogether, as it converts back into its component atoms. (Whether all the ether goes into the dispersing atoms, or some of it remains amorphous is moot. Unless all the ether becomes component atoms’ inther, a modified “phlogiston” theory will have to be revived. In which event, Damn the cannons. Full speed aback.) So, within wide ranges of latitude with respect to different chemical structures, heat is the wave interval whose promulgation causes the bodily circling motion of the component molecular and/or atomic groups of its conducting medium. So long as it is capable of causing such action it is “heat,” even though it be conducted by an amorphous ether in a vacuum chamber or an interstellar zone.

Once the interval has shortened to fit within given atoms, or within given shells of molecules, it May become inergic. Inergy waves circulating within molecular shells are called “chemical energy.” The items found in such shell layers, i.e., the atoms and atomic nuclei, will now take part in the circling and then the spinning actions. When the inergy shortens to an interval able to affect the electron and proton nodes it becomes “electro-magnetic energy.” It may become inergic to those very minute intimate layers that don’t have particulate nodes, whereupon it has become quanta of x-rays. When atomic nuclei take in the action “nuclear force” is the name. And the overall gradients that inx-rinx through and out of the cad, pervading and permeating the structure and anatomies of all components, is called “gravity.”

Phase Two: Dinsity Changes

There are several ways that the dinsity may change.
A. Actions outside the cad may require exther, and our cad may be the source of such exther. In that event, some of our inther will be lost and the cad dinsity must decrease. The effect will follow Newton’s rule, being stronger closer to the cause. This will establish an overall gradient that will permeate the cad and everything in it. It will be both a decreased ether dinsity and a decreased sorce value. The net effect will be to “pull out” the units, like a pull-stretched rubber ball, flattening out all slopes and lowering the P and Q values.

Since units refract internally in the direction of flatter slopes, this will create an “attraction” in the direction of the outside cause.

B. There may be an excess of outside ether, and wherever the dinsity of the matrix is less than that touching it, (and where the sorce also is heavier on the dinser side) ether will flow into the cad matrix. What will happen now? We might as well admit that whether there will be expansions or contractions of unit nuclei and surroundings under pressure and absolute dens changes depends on interlocked variables, and cannot be cleanly broken down into pure sorce or pure dinsity effects. In brief, dinsity and sorce changes can come about either from absorptions or releases of energy and material by matter units, where such changes are the result of spin or linear motion Venturi changes either inside or outside of the cad. Such changes are strongly buffered as we have seen in former chapters.

Though it might be slightly out of context, at this point we could introduce the entire modern quantum mechanics by postulating that the amount of equilibrium spin is balanced by resulting changes of sorce, dinsity, inx-rinx, internal resonances of nodes so that only one-half quantum number rate-of-spin multiples can yield a stable interrelation and a lasting core. In that event, it should be gradually recognized that the quantum number actually is some kind of a ratio, wherefore substitution of ether dinsity, sorce pressure, dinsity gradient summations, etc., into appropriate places in existing mathematical expressions (which are today inescapably abstract) should not only instill physical meaning to the expressions, but should point the directions for almost instant completion of all further theoretical mathematical physics.

Phase Three: Sorce Changes

While dinsity and sorce changes usually occur together, there are differences in their effects and mode of spread. Dinsity changes require a flow of material, and material is blocked whenever it hits dinser material. Not so for sorce. Sorce penetrates and is conducted everywhere. Ether gradients will persist, as shown by the gradients around nuclei. But sorce tends always to equalize in all directions. Indeed, it is exactly in order to equalize sorce that ether gradients persist.

The rinx actions around a spinning nucleus now require some elaboration. Since spin has polarity, the moment of spin is continuously variable as one moves from pole to pole (even though the unit spins at a constant rate). Venturi imbalances will occur. While this would tend to create a Van Allen belt type
configuration of the shell-layer systems as inx is satisfied, the -Y effect (shown between units E and F) shows that ether will flow perpendicularly to all sorce changes (as in Pz). So even though rinx cannot be satisfied along its own radius from the core, ether can -Y into the zones so as to establish the gradients completely around the spinning core rather than just around the equatorial levels.

All of which brings us to the conclusion, once again, that sorce tends ever to equalize in all directions, wherefore sorce gradients will be transient, and are the mechanism of field forces while they persist.

Sorce may either decrease or increase around a given unit. The changes may be caused by changes of the unit itself or changes of its environment.

A variation of sorce around a given unit by virtue of altered energies of said unit will spread through the cad according to the square of the distance law. If the change is a pressure drop, that drop will first spread through the cad, decreasing sorce wherever it goes, and will then be countered by inxing ether. If the ether is blocked from inxing, sorce gradients will persist, which will cause changes of size and relation of all components. And vice versa for increases.

It should be reiterated that sorce changes can penetrate beyond the ranges of ether gradients. An ether gradient declines in value only to the minimum value of the cad. Sorce pressure can decline below a cad minimum, thus reducing that minimum and the effects it had created. Since the actions created by plus or minus sorce and dinsity changes depend on the matter-units present and on the relations between such units, let us examine the effects relation has.

Phase Four: The Effects of Inx-Rinx on Adjacent Units

1. Inx is a dinser medium caused by a local sorce or pressure imbalance.
2. In dinser media, intervals shorten.
3. When intervals are short enough, and the medium above a critical dinsity value, wavicles become particles.
4. Waves refract into dinser media. Particles also refract in such media until the dinsity of the medium surpasses that of the particle, at which point the particle reflects.
5. Sorce pressures (the cause of inx) permeate the exther of inxing units. Such sorce imbalances thus permeate all adjacent units.
6. The cause of each unit’s inther configuration thus permeates and is opposed by oppositely directed overlapping, gradients of adjacent units, and is augmented by similarly directed gradients.
7. The ether gradients therefore flatten out between mutually inxing units, and increase on their far sides. Such alterations are in direct proportion to the slopes that overlap at a given position. (See Figure 42-1.)
8. Rinx, which is a sorce imbalance perpendicular to inx, cannot similarly be accommodated in such approximal zones. Overlapping proximal rinx effects therefore increase each other, and can be satisfied only from the exther of the two units, i.e., the cad matrix itself, hence ultimately the universal exther. If the exther
is unable to penetrate said cad, then the imbalance persists and constitutes a force field.

9. It follows therefore that between adjacent units that are close enough gradients flatten but rinx amplifies.

10. It next follows that if esther is available, it will satisfy the rinx imbalance, and thereby raise the absolute dinsity so as to accomplish the flattening of the interproximal gradients.

11. The closer the non-overlapping gradients the lower the cad matrix dinsity and the steeper the slopes. Therefore, in such gases the unit nuclei will repel each other with a force proportionate to their closeness, all other things being equal—meaning that the closer the units the greater the repulsion. This explains the mechanism of the fact that the closer we push gas units to each other (the less the volume) the greater the pressure.

IV

Applying these considerations to a study of Figure 42-1 provides an avenue by which all existing quantitative expressions of present physics can be derived and understood in terms of things themselves.

Some quantitative relations that readily leap from the figure are:

1. Where the slopes overlap, quadrants of like sign increase the pitch while quadrants of opposite sign decrease it.

2. Where inther and inergy are readily available, the final slopes will be those represented by the $g_2$ lines. Where ether and/or energy are not readily available, there will be some intermediate slope attained. A slope between the $g_1$ and the $g_2$ lines. Since the $g_2$ slope represents the equilibrium condition for the matter unit, such intermediate slopes represent non-equilibrium conditions, conditions of stress. If the non-equilibrium slope is represented by $g_3$, then $g_3$ minus $g_2$ is the amount of inther required. (Note that the $g$ lines should be three dimensional, representing a spherical cone of dinsity. The difference between an equilibrium cone and an existing cone is volumetric, thus represents a volume of inther.) The dis-equilibrium ($dG$) thus is $g_2 - g_3$. The total potential dis-equilibrium, then, is $g_2 - g_1$ in three dimensions.

3. When there is an ether $dG$, then there must also be a sorce imbalance. If $Y$ represents the amount of that imbalance, then the new sorce value ($P_s$) will be $P$ minus $Y$, and $Y$ represents the difference between normal equilibrium sorce and the existing sorce. $Y$ may thus also be written $dP$.

4. The evidence is that $dP$ and $dG$ are functions of each other.
5. The change from an F-H to an F-E relation represents the conversion from a liquid to a gas. There is a precise amount of inther and inergy involved. The amount of inergy needed to cause the amount of increased nuclear spin required to bring the slope of point II to that of point I is the energy of vaporization for that atom. The amount of inther between the F-H cone and the F-E cone is the amount released as a small-scale flowback into the newly gaseous cad matrix. The mechanism for conversions from liquid to solid similarly involve discrete portions of matter and energy.

6. The shell-layer variations from a smooth hyperbola introduce all of the quantum relations, when the dinsity-inther-inergy limit mechanisms per shell are added into the picture and the equilibrium spin-rate ratios are inserted.

7. When a liquid (or solid) molar unit changes to a gaseous one, the component unit’s nucleus and immediate shell-layers condense, but the outer layers severely expand and decompress. Whereupon the matrix layers become more and more fluid.

8. It is seen that the H-D relation has permitted the sum at point III to be greater than on either side of that point. This shows that the dinsity of the cad matrix layer can be greater than that of contiguous shell-layers. Since ether does not penetrate dinsier ether, this type of matrix blocks component units into their own compartments. This molar object portion is therefore “solid.”

9. Looked at from another point of view (Figure 43-3) in which Figure 42-1 appears as a mountain range seen from the sky, the mechanisms of molecular formation and of a chemical bond become clearly evident. As soon as we finish this brief excursion into quantitative relations we shall pursue molecule-making.

10. It is readily apparent that there are two kinds of attraction and repulsion cause-effects. The first is the bodily overlapping (or colliding) of unit to unit, or unit to dinsity gradient of a neighbor. Such effects are at immediate range and are very strong. For instance, when a layer of ether of density 1 hits a layer of density 2, it bounces, compresses, or otherwise gets out of the way. When a wavicle enters a dinsity greater than the critical value, it strobons and reflects directly out of the area. Strong effects.

On the other hand, the radiating source-Venturi changes spread far beyond the bounds of the given source-unit and create minor changes in the configuration of transmitting units. Such minor changes are able to influence the orbits of inergies, hence the motions of such units. These effects are much weaker.

If we inserted electrons, protons, etc., into their wave or particle positions in the atom’s shell-layer hyperbolachs (like kinderlach) then calculate the number of orbits per second times the amount of refraction per orbit caused by the gradient changes imposed by the inx-rinx field Earth establishes on the unit, we will have the rate at which this unit responds to gravity. If we now introduced comparisons between (a) the absolute amounts of inergy and inther, and (b) the absolute value of the g lines and changes therein for units of different atomic number, hence
different absolute internal densities, inergies, etc., we would thereby find the relative differences in the strengths of such refractions and/or reflections. We would have discovered not only the quantitative value of the “mass” of such objects, but more importantly, the qualitative understanding of precisely what “mass” is!

“Mass” is the strength of the refraction of inergies of various units to the existing configuration. Once that is understood it may be seen that:

1. The greater the absolute density of the unit the stronger the refraction.
2. The absolute density is a function of the amount of inergy.
3. Mass therefore depends on both densa per unit and inergy per unit.
4. In effect, then, mass is a direct measure of the amount of organization present, since the inergy and inther are a mutual cause-effect pattern.

It follows, therefore, that unorganized amorphous matter (free ether) has no mass.

Since “gravity” is the reaction between the intrinsic patterned inergies of a unit to the exergy field imposed by an outside cause it follows that, in principle, we have but to manufacture the apparatus that can produce such a field to have invented a gravity machine. (An oscillator of the right frequency, spun on its axis at the right speed, might be just the thing.) Since the ether persists whether particulate or amorphous, the conversion of mass into non-mass is not in any way a destruction or conversion of material into energy. Conversely, the patterning of energy into locked configurations with the accompanying condensation and shaping of etheric matter, is not a conversion of energy into matter. Matter is substance. Energy is motion and pressure of, by, or through matter. The two are no more interconvertible than is a lemon drop convertible into pure yellow.
Chapter 43

Synthesis Resumes

Let us return to our synthesis. Back to qualitative understanding. Figure 42-1 demonstrated to us the mechanism of conversion from solid (H-D relation) to liquid (F-H relation) to gas (E-F, and E-FHD relations). Those relations also have demonstrated the physical reasons for the difference between these physical states of matter.

We are now ready to specify the methods by which energy causes the difference between the solid, liquid, and gaseous states of matter. It turns out that those methods are intimately related to the processes by which atoms chemically join to form molecules, molecules join to form molar bodies, etc. So, we find that as we complete this portion we shall have passed through the eye of the needle again, and, having analytically pinpointed the mechanisms of attraction and repulsion have begun to resume and complete our cosmic synthesis.

Since there is no such thing in nature as “an atom” we shall have to start with more than one. The atoms of any given element are the same, hence have the same slopes, gradients, shell layers, and configurations under given environmental conditions. These, then, are most easily merged into molecules. In such mergers, molecular shell-layers complete the equilibrium gradients and act as a common matrix layer for contained atoms. Contiguous atoms of other elements, which require different outer shell patterns, may either (a) cause the atoms of element one to become a part of such outer shells (thereby dispersing to a condition of
relative uniformity of the mixture), or (b) they may themselves become the outer layer components (again mixing relatively uniformly) or (c) they may find an equilibrium condition in inner shells of element one or its molecules, or (d) they may freely intermix. See Figure 43-1. If they enter such molecules bodily, they may circulate as extheric particles or they may merge also, to become part of compound molecules. Since different elements have different configurational equilibria, though, compound molecules are less stable under varied cad conditions than are like atoms, hence such molecules will be statistically less common in gaseous mixtures.

![Figure 43-1.](image)

The factor that controls these various mixtures and combinations is the slope relation. Each given unit requires a given average slope for the gradient of its outermost shell-layer. It will therefore move into a position of equilibrium wherever such a gradient exists, provided that no dinser media block it.
In Figure 43-2, we see that unit 1’s gradient is divided into segments. So is unit 2’s. We see that segment D of unit 1 corresponds in slope to segment C of unit 2. Since segment C is the outer shell of unit 2, such a unit can find equilibrium within segment D of unit 1.

But when temperature alters, units undergo changes of size and gradient curve. Unlike units vary dissimilarly. So there will be conditions wherein unit 1’s segment D no longer corresponds to that required to complete unit 2, whereupon they will dissociate.

The introduction of max and/or lax constant intervals on the horizontal axis of Figure 43-2, which enclose the variable length lines of the gaxic dinsities, clearly demonstrates the mechanism of transformation operations between Reimann-Gaus geometries, Euclidean geometries, and/or any other geometries. Should we stipulate that the curved lines between the constant Euclidean intervals are themselves of “equal length,” we must introduce variable lengths and times to compensate. The amounts of such It curvature of the space-time continuum” obviously must correspond to the degree of variation of the slope—from point to infinitely nearby point—or to the dinsity changes that are represented by such slopes and gradients from a larger point of view. Referring slopes ever to the
Euclideanly constant baseline for comparative purposes even provides us with the rationale of the Lorentz-Fitzgerald transformation and/or contraction equations.

Side B of Figure 43-2 shows two atoms with outer shells of the same gradient. There are several differences between these atoms, but they do have a common outer-shell equilibrium-maintaining configuration. The differences are that they have different numbers of shells, the inner shells do not conform in pattern, and they are on different sides of each other’s outer shell.

Here is where endothermic and exothermic chemical combinations and molecular formations come into play. For atom 2 to get on the same side of the outer shell as atom one, both of them have to be inside it! Then, and only then, the gradient of that outer shell is one and the same equilibrium pattern for both atoms. In so joining, though, some of the inner shells must regroup to form mutually harmonious doubling pattern of shell-thicknesses. To that end, a certain amount of change in various shell thicknesses must take place, an interflow of inther and inergy of the merging outer shells must take place, and some energy and ether may be either gained or lost from or to the cad.

When such reactions are completed, the component atoms will have very exact final positions of equilibrium within the overall shell-layers of the molecule. Each atom will have a specific inner shell that it must occupy in order for its own shell-layer equilibrium pattern to be complete.

Since the molecular shells are the matrix layers of the cad, with respect to the contained atomic components, it follows that the physical conditions of the cad matrix (pressure, temperature, state, gradient, absolute dinsity, size) are the control factor over the types of chemical combinations that can occur, as well as over the physical state the product will assume under the conditions of combination.

An examination of the overlapping slope zones, with the rinx satisfying flow of exther demonstrates a most significant physical result. In such proximating zones between properly balanced units at certain set distances there are actual tubes of interconnecting material. Actual dinsity bridges. (See Figure 43-3.)
Through such bridges of material the resonance waves and/or electrons that circulate in such interconnected shell-layers may flow. In response to the gradients and greater dinsity in such tubes, traversing inergeries will curve toward the center of them, thereby establishing Venturi inx-rinx conditions against the tube walls. In short order the tubes will become extensions of the shell-layers, connecting units together in chemical bondage.

It is highly probable that such “valence bonds” are transient formations, found only under highly specialized conditions. What is more likely is that these tubes of matter and energy will set up conditions similar to those of the outer shell-layers of component units, that such bridges will absorb their atoms or atomic
groupings into themselves, so as to become full shell-layers surrounding the incorporated units. On the other hand, the units balanced at the ends of such valence tubes could spin independently of each other, or in harmony with each other, so as to remain in position as opposite ends of a dumbbell shaped molecule.”

Indeed, even a ten minute consideration of the valence bond mechanism here defined must bring you to many other types and kinds of lasting or transitory possible combinations. (Isn’t it fun to find yourself thinking about chemical reactions by mentally following every minute detail of the physical actions themselves?)

Imagine two nuclei far apart, then closer and closer. See the gradients steepen between them and the rinx amplify? See the exther -Y into the zone to increase the absolute dinsity and flatten the slopes? Watch out! The critical dinsity was just surpassed, and a shock wave transition just occurred with heat and other exchanges. When the radiation cleared, a tube of dinsity linked the units. See the “valence bond”? Ah so.

When we remove energy to a point where there is the appropriate decrease in spin rate, there will be nuclear expansion, lessening slope pitch, elimination of repulsion and increase of matrix densities as the given gas liquifies. When the units get so close that the dinsity at the matrix midline sums to a greater value than on either side of that plane, the units have joined together as a solid. Just as there are dinsity bridges joining atoms into molecules, so are there dinsity crests, gradient peaks that “freeze” units together and permeate the molar body so formed. Throughout the object there form filamentous planes of concentrated ether that are an almost independently existing areolar framework locking each unit into its own cubicle.

Oh, the rich variety of possible combinations and relations. The mind leaps joyfully ahead creating imaginary solids, or pliable networks, or more fluid arrangements, or solutions inside of solid walls, or molecules into molecules into bigger and more varied ones with various gradients and energy transmissions and more and more and the whole universe.
Chapter 44

From Atoms to Cancer

It is curious to find that the essential chemicals of a live cell are the elements phosphorus, carbon, nitrogen, oxygen, and hydrogen. Their valences are 5, 4, 3, 2, and 1. Curious that these elements form self-perpetuating nucleo-proteins that come alive only when they are inside a cell nucleus. Curious that a cell has a nucleus filled with chromosomes surrounded by fine tubular trabecular networks singularly similar to the cad matrices. It has a larger, less dense protoplasm around that nucleus with an outer surface tension limiting membrane. A cell has the same pattern as any other atom-form matter unit!

Curious indeed that Earth has a nucleus (the planet itself) upon which myriad forms of life swarm, all radiating and imbibing energies and exergies that enter into the cad matrix to establish overall general patterns. Curious that there is a cell cytoplasm (the atmosphere and troposphere); that there is a protective membrane which screens out harmful exergies (the ozonosphere). A curious coincidence (if that’s what it is) that the temperature and pressure here is just that fine range required for coexistence of solid, liquid, and gas systems. Of the range from absolute zero to the tens of thousands of degrees possible, just that temperature-pressure range that allows the physical conditions requisite to living chemicals exists. The matter-unit Earth has the same pattern as any other atom-form cell!

So then. We start with atoms. The COHNS (carbon, oxygen, hydrogen, nitrogen, sulfur). Only we put a little phosphorus in instead of sulfur and brimstone. Same result! Add a bit of sunlight, the right cad matrix conditions, and
we soon have CO₂ and NH₃. Putting them together yields C₅ H₅ N₂ O₂ H, or C₅ H₅ O₃ H₅.

These are a protein and a sugar compound that are essential parts of nucleo-proteins. At this level of organization the differences between plant and animal are slight. A swift resume of the nucleo-protein make-up of plant versus animal cells shows the following interesting comparison.

### Plant Nucleic Acid Derivatives
1. Phosphoric acid
2. Adenine
3. Guanine
4. Cytosine
5. D-ribose
6. Uracil

### Animal Nucleic Acid Derivatives
1. Phosphoric acid
2. Adenine
3. Guanine
4. Cytosine
5. d-2 desoxyribose
6. Thymine

Four of the essential chemicals are the same for plant and animal, two differ. The standard structural formulae for these compounds are given below.
It is seen that there are many double bonds in these representations. While it is possible for density bridges stronger than cad matrix levels to exist, it is not geometrically possible for two such bridges to coexist between the same two nuclei. Accordingly, let us rewrite these formulae so that there are no such double bonds present but instead, the structure assumes the concentric pattern of a matter-unit. (After all, it is the matter-energy pattern between the atomic nuclei that is the structure of the tissue, in the present state of physics, chemistry, and biology, the x-ray pictured skeletons are mistaken as the entire structure. Actually, the real essence of these living chemicals resides mostly in the shell-layer systems and their ethenic interconnections and sorce inter-relations—which present science doesn’t even know exist.)

These structural forms show a remarkable similarity to one another. As we see, they also bear a striking similarity to the structural representation of the whole nucleo-molecule.
Normal Animal Nucleic Molecule— $\text{C}_{24}\text{H}_{24}\text{N}_{11}\text{O}_{12}\text{P} + \text{H}_{10}\text{N}_{4}$

This represents the combination of the six basic chemicals. An interesting part of this schematic form is that we must eliminate $\text{H}_{10}\text{N}_{4}$ ($4\text{N H}_2 + \text{H}_2$) to get it. To accomplish the removal of this segment, $\text{H}_2\text{O}$ and $\text{O}_2$ are needed just as in animal metabolism in the following reaction:

$$4\text{N H}_2 + \text{H}_2 + 6\text{H}_2\text{O} + \text{O}_2 + \text{H} \rightarrow 8\text{NH}_3\text{OH} + 2\text{H}_2\text{O}$$

The products yielded, again, conform to the actual waste products of metabolism. If nothing else, it is esthetically satisfying to find that all of the basic chemicals which make up the finished molecule have an identical structural pattern, and that the final molecular form also has that same basic pattern.
We now proceed to substitute each of the two plant basic chemicals to our chromosomal molecule. (It is necessary to emphasize that this is not intended to represent the actual molecule of the gene, as the number of molecules of each of the six basic chemicals in the one final molecule has not been considered. These gene forms are two dimensional, while the actual physical gene chemicals are four dimensional, ¹ and we merely wish to portray an empirical type of structure which can easily be modified to truly represent a finished molecule.) It is interesting to note that the structural form of the gene, as here represented, is very readily understood as a picture of a hollow, cylindrical living animal which corresponds to one of the most elementary forms of life in the tree of evolution.

¹ Fie on you flatlanders!
Structural Representation with Plant Sugar Substituted:—

\[ C_{24}H_{24}N_{11}O_{13}P + H_{10}N_{4} \]
Structural Representation with Plant Protein Substituted:—
C\textsubscript{24} H\textsubscript{24} N\textsubscript{11} O\textsubscript{13} P + H\textsubscript{10} N\textsubscript{4}
This form ends up with an unslaked valence on the phosphorus (or nitrogen) atom at the end of the molecule. As this is impossible, as well as abnormal, such a gene would have to react by rapid, insatiable growth.

It is much more possible that the H atom shown (above formula) would be found attached to the P. If it does that, it would act as an acid chemical having an accessible H atom. This would certainly act in an abnormal manner upon the rest of the cell involved.

It is possible that cancer, which has the two general classes “sarcoma” and “carcinoma,” is a gene throwback in which one of the plant chemicals somehow incorporates into the gene-molecule.

Recent “in vitro” studies have shown that desoxyribonucleic acid can be depolymerized by irradiation, and histochemical studies of Permutt and Johnson (Arch. Path. 55:20, January 1953) indicate that irradiation of the lens of the eye results in depolymerization of polysaccharide-protein complexes.

It is thus indicated that the type of cancer that is more susceptible to x-ray therapy would be the one in which there was an abnormality in the sugar constituent, and we therefore suggest that carcinoma derives from an essentially plant protein in an animal gene, and that sarcoma derives from a plant sugar living in an animal gene.

Although surgery and irradiation therapy have proven of some avail in the treatment of cancer, the most promising recent results reported by the Sloan-Kettering Institute are concerned with the growing success of new chemical agents in curing experimental cancers. The present treatments do not cure the cancerous tissues, they either kill or remove them. It would be much better if we could treat the diseased cells themselves, so as to bring them back to their normal, healthy role in the body. To do this it is necessary to properly understand the chemistry and forces involved in the development of those aberrant cells.

It seems probable, if the structural forms herein developed show a relatively accurate picture, that the chemicals which can correct the cancerous hookups should be predictable and synthesizable. In carcinoma the acid hydrogen atom must be replaced by a chemical unit containing a carbon-hydrogen unit. As it has been shown that cells are able to use complete structural molecular units in their anabolism, and as it appears that the improper protein unit is responsible for the troubles of the carcinomatous cells, an intravenous drip feeding of various chemicals should be administered to experimental animals under certain physical conditions to be specified.

A comparison of the n. a. formulae for a normal animal nucleic acid molecule and one with a plant sugar and plant protein substitute reveals that the plant protein. n. a. has a CH missing and an extra ionizable hydrogen atom. We
consider it to be the representation of a carcinomatous molecule. The plant sugar substitute has a 5-valence P atom and an extra O atom.

We therefore suggest that the carcinomatous animal be subjected to a high-concentration intravenous drip of a pure thymine solution while under a high-pressure tissue-oxygen concentration. Insulin shock, or near shock, will create excess oxygen in the plasma. We suggest the use of x-ray therapy of the frequency of uracil, plus the simultaneous administration of safe concentrations of chemicals designed to carry CH₃ into the structure. Recent studies show the accumulation of CH₃ radicals upon the outside of nucleo-cancer proteins. Apparently the matrix layers of the molecule are not able to accept the CH₃, and cad changes are required. It is our purpose in this process to oxygenate off the extra hydrogen ion, to allow either a substitution of thymine back into the molecule or the absorption of the CH₃ portion so as to return the entire n. a. molecule back to normal. It is possible that intravenous administration of H-OH might do it, by the H buffering out and the OH taking the CH₃ into the gene. The simultaneous use of x-ray therapy of the prescribed frequency is with the objective of shattering the uracil segment out of the molecule, or else, as a last resort, of destroying cells possessing such a unit.

We suggest that the “sarcomatous” animal (the one with the plant sugar substitute) be subjected to a high-pressure hydrogen atmosphere, or other means of creating an acidosis be used, plus a high, intravenous drip concentration of animal sugar in the presence of a high-powered electromagnetic field with a variable polarity frequency of a 3-valence and/or a 5-valence P atom. The intention here is to hydrogenate off the extra O atom, and/or to substitute the proper sugar unit for the improper plant sugar. The field forces and high-pressure atmospheres are attempts to set up resonance vibrations in the appropriate portions of the appropriate n. a. molecules so as to make them either more susceptible to conversion into normal structures or so physically unstable as to destroy themselves.

We further suggest that the chemicals which have demonstrated any success in cancer therapy have their formulae rewritten in conformity with those herein used, and studied with the purpose of discovering any similarity of structural patterns which could then be the basis for the synthesis of numerous similar chemicals for further evaluation.

Some interesting items to offer some slight evidence in favor of the formulae used herein: If we study some segments of our gene forms we find that a number of drugs and chemicals which have severe effects on living cells fit very closely to our form.

The carbohydrates so necessary to life have already been shown to conform to our single-bond basic structure. The cholesterol family of body chemicals, so vital
in fat metabolism, also neatly follow the structural form. The sterols follow the pattern, as do other essential body chemicals.

The HCN pattern that is ever recurrent in our structure is easily recognized as that most deadly poison, hydrogen cyanide. It is readily seen that so active and perfectly formed a structure as is HCN (with respect to the heart of our n.a. structure) could play havoc with a molecule such as ours. It can similarly be easily understood that nitrous oxide would play a ready role in the actions of our gene molecule. It is, indeed, a general anesthetic.

It is not absolutely necessary for the plant chemicals to be present, in these various combinations, for the conclusions to be possible. The patterns shown by our “shorthand” formulae show that where an animal is constructed with a 5-valence phosphorus atom, or an extra oxygen atom, or an ionizable hydrogen atom, it will not establish an equilibrium matrix in its cad, hence will not mature normally. It is thus possible that the cause of the most fearsome disease of man is the tiniest of chemical forms, the atom. Mayhap just one atom—phosphorus.

It is curious that it is the 5-valence atom that changes. Curious coincidence that it is so difficult to construct an atom of mass 5. Curious also that the fifth planet from the sun no longer exists. Well, in the light of our acquaintance with the hierarchy of matter-units perhaps it is neither curious nor coincidence.

The asteroids orbit the shell-layer bounds of the fifth shell from the sun. There can be little doubt that they are the remains of what had once been a planet. In fact, since the size of Earth’s moon is so out of the usual (too large), it is quite possible that the Moon was once the nucleus of that fifth planet.

There seems to be a physical reason why the fifth shell-layer is unstable. The first lasting explanation I could devise for that has to do with whole numbers of wave systems fitting into a given shell-layer. The fifth layer is the first one that breaks the doubling order of sizes, if you recall. (See the “sun-formula” progression on page 144). Without delving too deeply into Pythagorean number-dreams, we can follow this progression of sizes thus. Where Q is 4:

1. $1.5 \times 2^0 Q = 6$
2. $1.5 \times 2^1 Q = 12$
3. $1.5 \times 2^2 Q = 24$
4. $1.5 \times 2^3 Q = 48$
5. 1.5 NO! The fifth layer is the thickness of the fourth plus the third. It is therefore 72.
6. 1. 5 NO again. The sixth is the fifth plus the second, or 72 plus 12, which is 84.
7. Seven is 90.
8. Repeats 7, and is either the outer “surface tension” shell or it is the first shell-layer of the second series of shells.
When we apply certain concepts to a study of this chart, some interesting possibilities appear. The concept to remember is that the density decreases with the square of the distance, so that shell-layers have to get considerably thicker just to have the same linear densa per shell, in the inx-rinx curving mechanisms that create such shell-layer patterns. (Excuse me, please. It just happens that that’s the way it is.) When we subtract the various thicknesses of successive layers from each other in accord with such densa concepts, we find that the differences are: 0, 6, 12, 24, 24, 12, 6, 0.

This is a very pretty result, demonstrating that as the outside cad is approached, the unit’s shells contract (in gas units, though not in lay units) in a reverse progression. “Electronic” waves that resonate in those shells are transverse waves, hence must exist in whole number multiples lest at some given point material must be in two places at the same time. We can see that there would be a zone of unusual and extreme electromagnetic-gravitational-inx-rinx tension circling any shell that wished to have either a non-whole number set of waves or two different numbers of such waves inxing and -inxing across each other simultaneously. The prettiness of the result found in the last paragraph is that it shows a doubling sequence of shell-thicknesses, but from a gas point of view, the doubling is both from the nucleus out and from the outside layers in. The crossing over occurs at the fifth shell. Also, 6 is 3 \times 2, 12 is 4 \times 3, 24 is 5 \times \ldots, no, it has to be 6 \times 4. No 5.

It is a strong possibility that when Asteroid hit the turbulent zone, it shattered into Asteroids and Moon, that Moon flipped into an orbit around Earth, that the etheric density of the third shell-layer condensed considerably under those conditions, that the gravitational field in that system sharply and suddenly increased—whereupon all very large creatures became too heavy to survive, that the planet turned its axis, that heavy lasting precipitation followed such changes, and may have lasted for even forty days and nights, deluging the Earth. Planets and plants alike, cancer is an unstable pattern.
The Second Law of Thermodynamics

“The law that entropy always increases—the second law of thermodynamics—holds, I think, the supreme position among the laws of nature. If someone points out to you that your pet theory of the universe is in disagreement with Maxwell’s equations—then so much the worse for Maxwell’s equations. If it is found to be contradicted by observation—well, these experimentalists do bungle things sometimes. But if your theory is found to be against the Second Law of Thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation.” So wrote Eddington in his wonderful book, “The Nature of the Physical World.”

Quite a while ago we insisted, that the secondary forms of energy have no special precedence over one another and that heat should not be a “least common denominator” into which all available useful energy will fall. It was stated that the Second Law of Thermodynamics required revision. The elucidation of the mechanisms of energy have brought us to the stage where we can now produce that modification.
The critical meaning of the Second Law is bound up in the concept that “Although the energy equivalence of heat and mechanical energy is complete—the same when the transfer is in either direction—there is an essential difference between transfers in the two directions. We can easily change all of a supply of gross mechanical energy into heat; but we can normally change only a fraction of the heat available into gross mechanical energy.” (Physical Science Study Committee, Physics, pp. 435-436. D. C. Heath and Co., Boston, 1960.) Accordingly, over the eons, all mechanical energy will convert into heat with no self-sustaining comparable reconversion into usable energy present in nature to restoke the furnaces, as it were.

What are the cosmic furnaces, then. Are not the stars themselves the basic concentrations of energy that are the ultimate sources of heat? Yes. Then is there no mechanism whereby new stars can be created to take the place of old, cindery ones? Yes. How? Stellar gas clouds congregate in space, condense upon themselves and become not only individual stars, but even whole galactic nebulae at times.

If it could be shown that heat is itself the motive cause of such gas clouds congregating, then here would be a perfectly eternal cycle of energy interconversions that would destroy the general philosophic truth of the Second Law, while leaving it perfectly whole and useful on the local (planetary) level. The line of logic goes thus:
1. We require a continuous self-sustaining process to transfer heat from a colder body A to a hotter body B.
2. This requires a continuous self-sustaining process by which colder body A can spontaneously get hotter.
3. If colder body A is a gas cloud, condensing will heat it.
4. If and when gas cloud A gets hotter than any body B, then poof—you defunct old Second Law.
5. Is there a “spontaneous” process for causing the condensation of step 3 and generating the heat in step 2?
6. Yes. Gravity! Under the influence of its own internal gravity cold gas cloud object A will condense, condense, increase internal pressure, HEAT UP, and in time get so massive and hot as to explode into a thermonuclear self-sustaining, heat-releasing mechanism; a hot object (B) warming object (A). A Star.

The critical step in this cycle, the step which closes the entropic line from a dead end into a Second Law-defying circle requires that,
7. Heat is similar to the other secondary forms of energy in being capable of “attracting” matter-units. It must be shown that heat itself can be the first gravitational source, the cause of the beginning-concentration of such stellar gas
clouds so that by its very own product, “heat,” entropy has started the cycle over again.

We shall now demonstrate that: (1) Heat acts as gravity. (2) Heat necessarily congregates to certain cads, attracting there stellar gas-clouds which then generate full-blown gravitational fields and consequent organization on a massive galactic scale. So that (3) Entropy IMPOSES the ultimate conversion of heat into gravity.

Any thought at all will convince you that gravity is the beginning point of the present ladder of entropy, wherefore the above mechanism eliminates the general truth of the present Second Law of Thermodynamics except as a limited special case.

In this book the point of departure for reasoned thinking is always sense-evidence received results of physical experiment. The gravitational equivalence of heat accordingly will be introduced by an experiment.

Get yourself a cigar and two wide-mouth jars such that the neck of one fits closely inside the other. Light up. Now carefully blow three mouthfuls of smoke down the side of one jar and invert the second jar above it. When the interconnected jars are left alone with the smoke at the bottom of the first one, you will note that in a minute or so a distinct boundary layer appears between the smoke and the air above it. After a few minutes the body of smoke will be seen to start oscillating at its boundary layer, while the level of that surface slowly falls.

After the smoke has first been placed and allowed to form its boundary layer, but before it has evaporated (about four or five minutes leeway) set a hot body in the vicinity of the jar. You will now see that the entire body of smoke very slowly moves toward that hot body!! (Watch the boundary surface to see the smoke congregate.) If the heat source is moved to a new position on another side of the jar the smoke will be seen to follow it. If the hot body is placed on top of the jars, the smoke will sometimes rise into the upper jar. I once tried this experiment with a sealed jar, and it still worked. This removed the possibility of convection currents rising past the open jar-mouth insertion so as to suck the smoke over to that side. No matter how or why this experiment works, however, it absolutely demonstrates that heat exerts a “gravitational” “attraction” on the molecules of smoke.

Smoke is a form of very fine dust. So are stellar gas clouds.
Our studies of the various interrelations of matter and energy saw the emergence of repeatedly larger matter-unit patterns. A matter-unit has increased density with the approach to its center. The galaxies have such structure. The density and pressure at the heart of a galaxy must therefore be vastly greater than at its outskirts. All of the evidence produced by experimental science confirms the curvature of radiant energies as they refract through such gradients. Since the amount of curvature as compared to the speed of the wave governs the size of a full turn per unit of energy, and since we see light coming from distant stars and galaxies, we admit that the average radius of curvature is vastly larger than a few galaxies. Nevertheless, sooner or later every radiant energy must curve into a return pattern, eventually to be captured when it hits an appropriate unit at the appropriate space-time angle. And since the curvatures are vastly sharper in dense galactic centers with steeply sloped gradients than in “empty” space, where the infinite number of equally weak slopes coming from an infinite number of stars in an infinite sphere of directions sum up to zero gradient (hence zero gravity), we can readily admit that the greater proportion of such energies must eventually come winging into those preconditioned zones of immense concentration.

In the fission and fusion reactions in stars¹ inther and inergy are released out of the organized forms of the participating atomic nuclei as they merge or split and

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¹ Editors Note: See the Plasma Cosmology model of stars and the entire Hertzsprung-Russell diagram at [http://www.electric-cosmos.org/sun.htm](http://www.electric-cosmos.org/sun.htm) for a more up-to-date and coherent model than the standard thermonuclear model.
arrive at new equilibrium conditions. The atomic energy so produced is only a variation on the theme of energy of vaporization or liquifcation. Rather than call it “energy of particulation,” or something like that let us merely recognize that the energy so released radiates out from all stars to replenish and increase the local source. It actually represents and is “resource.” The inther flows back into the local galactic matrix to raise the interstellar density and also replenish the supply of ether available for matter-unit formation.

Flowback is an interesting item. That which flows back is not only energy, it is also material. Flowback is the release of both matter and energy from an organized form of a self-persistent matter-unit. With flowback on a massive scale, as in the action of the millions of stars of a given galaxy, the general cad conditions of that galaxy are in a state of change. The free ether increases in quantity, hence in density. The amount of energy intrinsic to the galaxy, but extrinsic to any of the subordinate units therein, increases. The balancing action of the environment relative to the component units alters, hence the size and speeds of the subordinate units must alter accordingly.

We should expect that there would be equilibrium levels for stars, as well as atoms and molecules, whence at some P and Q level a slight change in density and energy of the surrounding cad would cause a sudden, quantum-like increase in the size of all components of the star, hence of the star itself.

We should expect that, over very much longer time intervals of galactic flowback, the entire galaxy will engage in such quantum-type expansions. Since the spaces between galaxies are filled with matter, we should expect that any such alterations of size of a given galaxy will cause alterations of the conditions of the cad around it, hence of the conditions of the cads of nearby galaxies. As in molecular structures, an expanding jump of one galaxy should be accompanied by a corresponding shrinkage of another galaxy, with an accompanying large-scale exchange of energies. Very interesting possibilities lie here.

Origins and endings lie here. The completion to the Second Law of Thermodynamics hides here. That Second Law has it that the universe is in a steady course of disorganization, from an implied time-point when it was all concentrated in one small compact explosive core. That law expects that it will all end with complete dispersion of all energy (and matter) into a uniform and changeless distribution.

That law doesn’t know that matter exists independently of energy. Nor does it know that matter is distributed in shell patterns of variable density around as well as throughout a galaxy. Nor does it know that the direction of flow of energy is altered by altered densities of the conducting medium; it can’t know this since it is denied that energy has such a conducting medium.

It therefore can’t know that the flowback release of the stars will travel in directions preset by the configurations of the galaxies. Nor that the final direction
of such flows must eventually be towards the center of some given galaxy. Nor that the curving path of such energies will set up Venturi effects perpendicularly to themselves, wherefore powerful electromagnetic fields must pervade all spaces in that galaxy. Nor that with the tremendous flowback of energy and matter toward the center of any given galaxy there must inevitably arise those geometrical crossing patterns of energies which set up the equilibrium conditions necessary for the birth of a self-persisting matter-energy unit in infinite numbers.

It may be said that flowback is the intermediate road between matter-unit disintegration and matter-unit birth, and that for every step in the direction of the present second law of thermodynamics there must be an equivalent step in the other direction, some place else at some later time. For every breakdown there is a buildup. There can be no final end to the galaxies, any more than there can have been a time-point origin. The present Second Law of Thermodynamics was only half the story. True, as far as it goes, but incomplete.

Let it be recognized that liberated heat energy is not free to move in all directions equally, but must rather follow the shell system density variations of matter-filled space. Such radiant energy will be curved into appropriately sloped gradient zones, whereupon there will be imbalanced heat quantities between one zone and other nearby zones. Let it then be recognized from the heat-loving smoke experiment that such concentrations of heat do act as gravitational fields to small level matter units, which will accordingly move into the zone. We ask now the simple admission that when matter-units congregate, they begin to form higher level units and develop real gravitational force fields as well as gravitational density slope fields.

It is apparent that:
1. Entropy is maximum conversion into heat.
2. Heat must eventually go to the center of galaxies as entropy increases.
3. Heat acts as gravity to molecular gases and dusts that fill galaxies.
4. Gravity causes organization and etheric concentration on a massive scale.

Therefore:
5. Entropy is a self-reversing cycle.

“Energy” used to be defined as “the ability to do work.” The idea that matter is somehow a form of energy, however, removed ultimate meaning from that definition. Furthermore, there is a vague discomfort in the notion that as “the ability to do work,” energy is never used up in doing some.

No. Energy is motion and/or pressure. It is not energy, but the organization of energy in matter that has the ability to do work. It was organization that has the classic ability to do work, all along. Entropy is the dimension in which we measure the amount of organization that is consumed in doing that work.
LAWS OF NATURE

Newton’s laws of motion are well known, and prior to Einstein were considered superior to the gospel truth in the field of physical science. These laws are based on Euclidean geometry.

The First Law of Motion: “Every body continues in a state of rest or uniform motion in a straight line, unless it is compelled to change that state by the application of some external force.

Let us state the case, then compare it against the “law.”
1. Every body exists within the body of a larger matter-unit.
2. Every body is thus within an exergy field of force which is itself centered elsewhere.
3. There is no place, therefore, where a body could “continue” according to such a law in the first place. The “law” must, then, be a pure invention.
4. As modern relativity considerations have shown, there is no such thing as a “straight line.” The “straight line” along which my pen drops when I let go of it is a curved line as judged from a man standing at rest on the stationary frame of his reference, the moon.
5. A void is the necessary background to this equable motion law. In such a background a matter-unit would lose its sorce, its Venturi effects, its organized form, and thus its identity as a body.
6. In the absence of some external force (sorce) every body would disappear. Certainly it could not inertially continue.
7. Newton’s First Law of Motion has no physical counterpart in nature, since nothing ever obeys it.

The Second Law of Motion: “Force equals mass times acceleration.” We have arbitrarily stated this law in the form of its equation (f = ma). As an equation, we cannot object to it. It does not work, however, the way Newton thought it did. He thought of “mass” as an invariant property of matter. It is not even a property of matter, let alone invariant. He thought of mass as independent of abram. It isn’t. He thought of acceleration in terms of the Euclidean space and time which he considered an integral part of nature itself. These systems and concepts all belong to the rational half of relation, thus are not a part of objective nature at all. He, and modern physics, thought of force as the expression of mass times acceleration. Had the understanding of the meaning of “mass” and “acceleration” been valid, this concept of force might also have been valid. Such has never been the case, unfortunately.

Oh yes. Oh indeed yes. They work. Newton’s or Einstein’s laws of motion (or Gauss’s, or Reimann’s or Euclid’s or des Carte’s or the Greeks’ or the Italians’) do work. But they don’t explain. They are so subjectively artificial that, should we
for a moment lose hold of the clear separation of relation into its twin halves, objective and subjective, should we confuse either half with the other, we are qualitatively lost even though quantitatively exact.

It is abundantly clear that the laws of motion and of thermodynamics must be revised. These laws appear more realistic:

**FIRST LAW OF MOTION**

It is the tendency of every unit so to rotate, vibrate, or translate as to neutralize the effects of any dinsity-sorce gradients within or against it.

**Corollary 1.** Every object seeks to move at terminal velocity unless forcibly prevented.

**Corollary 2.** The strength of that tendency toward terminal velocity is the weight of an object. The ratio of abram to terminal velocity is proportionate to the resisting force over the mass of the object so long as the product of that expression has values less than 1; and inversely proportionate and in an opposite physical direction when the value is greater than 1.

**Corollary 3.** Action equals reaction. This “corollary” may be taken as an independent third law of motion, but it can be deduced from strict pursuit of the mechanisms of the first law, above.

**Corollary 4.** Every object seeks its own level.

**SECOND LAW OF MOTION**

Unless converted into pressure, the total amount of motion is constant but tends to increase at the expense of pressure.

**Corollary 1.** The amount of refraction of a moving item is a function of the slope of the inx-rinx sorce-ether gradient, all other things being equal.

The “laws” of thermodynamics may now be generalized into these laws of energy:

**FIRST LAW OF ENERGY**
All secondary forms of energy are ultimately fully interconvertible with no loss in total quantity of primary energy during such conversions.

This law incorporates the present thermodynamic laws into one, by eliminating the existing second and third laws with the words “ultimately fully.” “Ultimately” requires galactic curvatures of radiant energy, with eon long accumulations of energy and ether at galactic centers where they can regroup into new matter-units again. It therefore leaves open a smidgen of room for the present law of entropy, on a small, local star system order of cad size.

SECOND LAW OF ENERGY

Energy dissipates asymmetrically.

In response to the dinsity patterns and gradients that exist everywhere, energy radiates in paths that refract into the zones of greater dinsity. Since increases of dinsity accompany increased concentrations of energy, this immediately introduces us to the Third Law of Energy and thus to the general law of matter-units.

THIRD LAW OF ENERGY

Energy attracts itself.

This is possibly one of the most explanatory laws of nature ever discovered. It will ultimately be seen that this law explains the mechanisms of sense, reason, and knowledge, and bids fair to explain life.

Since inergy condenses ether into steeper gradients, and gradients capture inergy, these laws of energy join the laws of motion to give reason and meaning to:

THE LAW OF MATTER-UNITS

Matter and energy condense each other into the organized patterns of matter-units when the relation is right.

The equation $e = mc^2$ is somewhat ambiguous. If mass and energy are equivalent, and $c$ is also a form of energy, then the equation is accurately
paraphrased: energy = energy energy (speed)^2. What, then, does science mean by the “e” on the left side of the equation?

It is by now clear to us that it is the energy of organization of the matter-unit that equals the mc^2. The energy of “organization of matter,” written

\[ e_{om} \]

Since the organizing energy of a matter-unit is its inergy, the fabled equation should properly be written either

\[ i = mc^2, \text{ where } i \text{ represents } e_{om} \]
or

\[ e_{om} = mc^2 \]

How utterly curious! It was the organization into matter-units that science occidentally left out. The “OM”, which is the influence) that differentiates cosmos into the myriad forms and objects of the known universe.

Science holds that heat represents the bottom of the ladder of secondary forms of energy. We asserted that all such forms are equivalent, then demonstrated that all of them, including heat, have the ability to attract matter. Then we showed that heat is not free to dissipate equilaterally through a feature-less, void cosmic space, but instead is concentrated into certain pre-existing paths governed by dinsky gradients that steepen with the approach to any given galaxy.

Since the accumulated heat then attracts matter there, this demonstrates that the anatomy of the galactic units is the organizing influence in the cosmos. It is that organizing factor which, by causing the accumulation of matter and energy so as to ensure the gradual development of gravitational fields, stars, planets, people—endlessly recreates the initial conditions that represent entropy’s starting zero-point.

It is thus seen that matter is indestructible and that energy also ‘is durable, wherefore the conditions for a steady cyclic-state universe—in which units come and go from time to time in place after place-do exist. The fact that energy dissipates asymmetrically in response to pre-existing galactic dinsky patterns ensures an ultimate reversal of entropy at every step of the way. That is how the Cosmic Explosion or Creation universes reach their Moments ONE.
We further find that the scientific answers have been telling us for the past several decades that nature is made of ubiquitous matter which everywhere contains varied amounts of motions and pressures, that the relations between these various segments and forms of matter are ever changeable and that all is very much as it appears to be to the only important final basic component part of nature: The conscious mind of the intelligent living observer.

We insist, in short, that the stellar release of ether and what eventually becomes heat from the intrinsic energy source of atomic nuclei must provide the physical conditions which will ensure the organization of other matter-units later on and elsewhere. The heat death of cad 1 is balanced by the heat birth of cad 2, and the universe will go on as infinitely long in the future as it has already persisted forever. Though the parts may come and go, the cosmos endures forever. And so do its basic items.
Epilogue

The Theory of Inevitable Evolution

An atom has a spinning nucleus with various gradients and inergies. In response to the inergies the nuclear barrier resonates at a certain vibratory rate. That in-out motion sets up inx-rinx waves which radiate out from the spinning nucleus to set up curving, beating wave systems throughout space. These wave systems constitute the gravitational waves which establish sorce and ether gradients also permeating space. Since “space” is composed of whatever is present, the gravitational fields and forces thereby permeate everything.

Each atom thus has existence, energy patterns, matter patterns, and the capacity to affect and react to its neighbors. Anything that changes either the inergy or the inther pattern affects the atom. When the inther-inergy patterns are sufficiently in harmony with those of contiguous neighbors, mergers occur. Molecules form, with the atomic central layers acting as nuclei spinning (or vibrating) therein.

Patterned inergies flow through and out of the molecule. Other patterns of exergies also flow through the molecule. To some of them, the molecule responds with changes of its own inther-inergy structures.

In time, certain kinds of complex molecules appear that have layers that react specifically to inx-rinx pulses of specific interval and slope. These molecules evidence irritability. They also develop specific reactions that move them into or out of such exergies.

Those that move into destructive exergies are destroyed. Those that move out of destructive exergies and into harmonious zones are not destroyed. They persist.
They act as nuclei to condition their environmental matrices into harmonious shell-layer systems. Those chemical structures which are mutually harmonious will soon be able to conform together. They will grow and selectively multiply. In time, matter-energy patterns will again set up matter-unit configurations in these very large molecules. Energies will flow throughout the molecule as though the component atoms that give rise to such ineriges did not exist, but were merely part of an overall matter-configuration.

These mechanisms could now be expanded to account for all forms of plant life. But somewhere along the line, somehow, consciousness appears. Individual consciousness.

Life exists, then consciousness appears. It seems to arise at the molecular level unit. The molecule, which is an energy pattern existing in material, somehow becomes consciously aware. Aware that it is too hot or too cold. Aware that it is light or dark. Aware of the exeriges affecting itself. Aware!

You know what “awareness” is in the only possible way. Through direct personal experience of it. Unfortunately, we are conscious only of our individual awareness. We cannot directly experience the awareness of anyone or anything else. We cannot, either, experience a lack of awareness. We cannot, therefore, know to a certainty where or how awareness exists. Since awareness depends on the reactions of certain matter-energy patterns and relations to each other, and since those patterns are utterly repetitive at each successive matter-unit level, it is most probable that awareness must also exist at each of these many levels.

Now we saw how the junction planes in a solid create the equivalent of valence bonds that run all through such materials, thereby making of them one huge molecule. Patterns of such energy-steering matrices that will conduct pulses along the entire material allow such materials to be good conductors. Metals are such materials.

Materials that can orient the energy patterns rather than merely conduct them, or merely react to them, are the patterns of life. It is the patterning itself that is the seat of consciousness and life. There is little doubt that we shall, in time, be able to understand every mechanism of consciousness and life, just as we do, or shall, for matter and energy. (The things themselves, matter-energy-consciousness, are not mechanisms and can be experienced, but not reasoned.)

In a cyclic-state cosmos matter-units come and go. When a star newly forms, the matter-unit anatomy inevitably follows. Shell-layers inx-rinx into existence. Orbital zones arise, and nuclei (planets) sooner or later are created to follow those orbits. Every mainline star must therefore have similar shell-layers, at the same gas distances and physical conditions. The temperatures, pressures, and chemistry of the third planet from whatever mainline star is involved must inevitably
progress through the same cycles of development. The same inx-rinx intervals of energy must necessarily come into play, to sparkle and strike at the same roiling liquid chemicals. Sooner or later, obeying the statistical probabilities of chance, the identical chemical combinations must occur at every such planet. Every possible chemical combination must inevitably take place, given time.

That same small group of chemical combinations that are able to survive and increase under the embryonic conditions of such a planet at such a stage of development must therefore eventually appear. Said chemicals, by their very own existence, will then begin to alter the conditions of the planet. In harmony with the continuing natural planetary changes that follow the evolution of each such star, the same chemicals in each such planet must cause the same changes. With each such change, new equilibrium chemicals will become possible, hence will sooner or later arise. Now the interplay of cause and effect begins to establish survival of the fittest mechanisms. Of all the possible combinations that inevitably arise, only the fittest to survive will do so. The “fittest” are always the same. They survived on Earth through millions of years of evolution even while other forms came, flourished for a while, then disappeared.

Inevitably motion, and the search for the appropriate chemicals (food) via sensitivity to light (sight), heat (feeling), gradients and dinsities (smell), pressure (touch, balance, and hearing) must occur. Inevitably those chemicals most sensitive to the various forms of energy must out-survive those less sensitive, to evolve into specialized anatomical zones. These evolving senses more or less successfully equip the organism for survival. Those organisms whose senses give the more exact representations of the outside reality will be the ones best able to survive. Inevitably they will follow the same progression, in which every chemical combination possible at the successive stages of the planet’s and of the species’ physical development will occur. The final product is ever the same.

The successful evolution and multiplication, through endless personal war between individual and individual, species arid species, life and non-life, must inevitably alter the chemistry of the planet so as to change conditions. The development of widespread organisms causes the production of vast amounts of certain types of gases. Said gases must inevitably seek their own level of equilibrium in the atmosphere so as to screen and filter the sunlight. Changes follow. New organisms then become more fit, for the first time, and evolve.

Motion and sense require the development of musculature and sense-carriers. Nervous systems, carrying structures and the rest of the possible combinations must inevitably follow because:
THE LAW OF EVOLUTION

Structure evolves in response to patterning functional use. All of our previous studies show that matter-patterns form in response to energy patterns. Energy patterns are steered by matter-patterns. (Cutting off every monkey’s tail doesn’t stop each new monkey from trying to use its no-longer-present tail. The new monkeys all have tails. But you don’t! You, you hairless miniature ape, have stopped using your tail and it has evolved out of existence!)

The fact that matter-energy patterns form each other ensures that the Law of Evolution is correct. The Third Law of Energy and the Law of Matter-Units are the processes by which, cell to cell, cad-matrix changes permeate the organisms to slowly alter the pattern even of the nucleoprotein molecules in the genes.

We know that survival of the fittest, motion, search for food and comfort, all inevitably must follow—the existence of miniscule life. We know that identical planetary changes must occur, that identical modes of locomotion, energy and material metabolism must occur. All that are possible will eventually occur, and those that are fit will survive to alter planetary conditions so as to further the inevitable rise of new possible permutations and combinations.

In time, swimming; crawling, flying, climbing forms of life must arise. Breathing, fermenting, or other energy releasing processes must occur and inevitably they must be those that are possible, and then those that do, survive.

In response to function appendages must develop. Every kind. Those best fitted to grasping, best susceptible to control by the types of nervous systems that must inevitably evolve under these identical conditions throughout the cosmos must arise.

Inevitably individual warfare must give way to group warfare. Group warfare inevitably leads to group life, to societies. Societies must inevitably continue the natural evolutionary heritage of warfare, until every condition and possibility of social life has been evolved, led to new evolutions, and further evolved.

The end result is as certain as the end result of a fertilized human egg.

Something big is evolving. Something that staggers the imagination. Something that nevertheless is as comprehensible by us as it is dependent upon us. We are the local component items of that inevitable evolution.

The development of intelligence changes the mechanism of evolution. A new stage arises, wherein deliberate choice appears. Taste and values begin to play a role in the types of forms that procreate. Mindless warfare produces certain functions, from which certain structures must result. Intelligent will and free choice appear. Man evolves. Inevitably. In time, man must evolve through every step of the development of culture, science, and religion. In time, that stage of evolution reaches its completion. Under the aegis of intelligent will, evolution
through the stage of the survival of the fittest (warfare) must inevitably conclude. It does so when it has progressed to the point where the next evolutionary stage begins. Just as the embryonic fish-stage suddenly stops becoming a fish and starts to develop lungs, arms and legs, a brain, so must the planetary warfare stage end when the planet is completed and life is ready to move out into larger reaches of that developing star system.

From sensitivity to irritability. From irritability to motility. Then to warfare and evolution through awareness and into intelligence. From intelligent will and knowing control the next state of growth must necessarily follow. Suddenly and as though by mutation. Unexpectedly, just as it seems that a dead end has been reached a turn, a corner is passed and the whole newly widened road unfolds in glorious splendor as warfare ends and purpose begins.

It is evident that we, the human race, are the intelligent element of this thereby living planet. And Earth thereby becomes the live component of the solar system. Sol thus becomes the live moment in the Galaxy. And life thus exists in the one cosmos. It is time that we begin to order our internal relations into harmony with the destiny which is manifestly ours. A manifest destiny requiring the total endeavor of Earth’s people who, though few in number for so mighty a fate, have already begun to move.

Indeed, we have reached every end of this world, from highest stratosphere through deepest iron heart. The world kingdom of Earth has been totally explored.

On the day that Man first steps upon the Moon we shall at that moment have entered into the kingdom of the heavens. A vast realm waits our entry, our thrusting intelligent life, or gradual assumption of control and command. Our whole galaxy waits to come alive.

It is written that this murderous world shall have come to an end in 1966. So be it. Let the order be spread throughout the armies of all the lands, “Go home. Come home. The world has come to its end and the long, long war is over.”

To expand life and to extend intelligent control over the farthest reaches of matter and energy. That is the purpose.

November 2, 1964.
**Glossary**

**Abram**: is **absolute rate** of **motion** in densa per second. (See densa, below.)

With respect to an object moving through a space filled with material of some concentration or other, we may wish to specify the absolute rate of motion of the object. We do so by specifying the number of cubic densa displaced per unit time. Thus, the “abram” of anything represents its absolute rate of motion in densa per second. (It might be wise to point out that “density” itself may be stated in densa.) Since ether is compressible, it follows that the number of densa per cubic foot of volume is variable.

**Cad**: is the **cavern density**, in densa, of any specified zone in the cosmos, and includes said zone itself. (See density, below.)

In considering absolute motion, and abram, we must adopt an arbitrarily finite spatial volume as the focus of our considerations, a volume filled with a medium of whatever density happens to be present in the zone under consideration. The zone is a real zone, but its size is arbitrarily fixed by us. The material medium which fills that imaginary “cavern” shall always be the background medium in our discussions of absolute motion, abrams and number of densa involved in the actions considered. It thus is of some importance that we know the density of our cavern, as well as the position, hence state of motion, of that cavern relative to the sequence of matter-units as well as relative to other caverns elsewhere. We must know the nature of our “cad.”

**Density**: is defined as “mass per unit volume”. A compressible material, however, may have a variable volume, depending on its degree of compression. This leads to a semantic trouble: amorphous matter has no mass!
Hence, the mass per unit volume is not involved when a massless material continuum expands or contracts. To say that the “density” of the medium changed when its volume altered therefore would convey misleading and even false connotations.

That one can have a variable quantity of matter per unit volume without the existence of mass is a novel concept that rests on two ideas: one, amorphous matter exists and is bodily compressible; two, “mass” is not a property of basic matter. Since “density” does not apply to a massless substance the novel concept requires its own precise term.

We need a word that denotes the variable degree of local concentration of a given portion of compressible matter.

**Density:** denotes amount of matter per unit volume whether or not any of it has weight in a gravitational field.

Note that this concept and the word for it are applicable whether some of the matter there has mass or not. One “densum” is the amount of matter in one cc in a vacuum in which the speed of light is 300,000 km/sec.

**Densum:** One “densum” (plural: densa) is the amount of matter in one cc in a local vacuum in which the speed of light is 300,000 km/sec.

**Density:** denotes amount of matter per unit volume whether or not any of it has weight in a gravitational field.

Note that this concept and the word for it are applicable whether some of the matter there has mass or not.

**Energy:** “Energy” is the ability to do work. That which possesses this ability is matter. That which provides matter with the ability to do work is the difference in degree of organization of different portions of matter. That difference is the result of the interplay of motion, pressure, and density of matter, all of which join to organize and create particles.

Being a complex product, energy is not a basic item.

**Exergy:** is extrinsic energy.

**Inergy:** intrinsic energy. What is inergy to one level unit is exergy to all its components. What is inergy to a component unit, however, is still part of the inergy of its parent unit. An important point to note, here, is that the component units of a larger matter-unit are the material field within that larger unit, hence are the conducting medium for all energies present in that larger unit. Hence, the
extrinsic energy of a nucleo-protein hydrogen atom is nevertheless present within that hydrogen atom even though it is an extrinsic form of energy so far as the hydrogen atom is concerned. The general field pattern of a matter-unit (its inergy) is controlled by the anatomical structure of that larger unit, and pervades all component units as though they were a continuum. Hence, there can be many differently patterned fields in a given unit.

We shall see that every matter-unit is an equilibrium pattern between a contained amount of intrinsic energy that moves in certain paths which are controlled by the dinsity pattern of that unit, which dinsity pattern is in turn a result of the relation between the locked-in energy and the surrounding sorce. We may abstract from this concept the idea that every matter-unit has an “inergy field,” an intrinsic patterned flow of energy throughout the entire form of that unit.

Consider several units, each representative of a successively higher level matter-unit. For instance, matter-unit A, an atomic component of matter-unit B, a molecular component of unit C, the earth component of unit D, the solar system component of unit E, the Milky Way Galactic component of etc., etc., a component member of unlimited X, the cosmos. Take under consideration the inergy field of unit B. The fact that a bit of the inergy field of unit B can exist throughout the body of subordinate unit A means that the inergy-field pattern of density of that unit A is conditioned by the exergy of A into minute deviations from the normal A inergy pattern. The fact that the parent-unit B of such a subordinate unit A may be part of another, higher level unit C, which is part of a D, etc., etc., means that a number of different density patterns (each dependent for its form upon the overall inergy of successively larger cads and matter-units) may co-exist within any given unit. Further, the exergy field of any unit A remains at its relative positon in the cad of the parent unit B. even when component A therein moves away. Thus, the inergy field of a unit will always remain with that unit when it moves, but the exergy fields that exist throughout the bodies of such units will vary in pattern within that subordinate, according to the variations of position of such subordinates with respect to the parent unit to which the exergy fields of such units A are inergy fields.

**Entropy**: is the dimension with which we measure the relative amount of organization of matter and energy. Maximum concentration is designated as zero entropy. Total dispersion, were such a state possible, would be designated as 100% entropy.

**Ether**: denotes the continuity aspect of ubiquitous matter even if that continuity may be neither homogeneous nor amorphous.
If it be an iceberg that a radio wave traversed, and even though ice completely fills the berg, the material formed into that iceberg comprises the “ether” that underwent the wave sequence of motions and pressures and thus conducted the radio wave moving through. If the same wave progresses out into interstellar space the amorphous form of the same basic matter that icebergs are made of comprises the local ether that undergoes such waves.

There is no place in the universe that is not, to some extent, part of some organized unit. Hence the amorphousness of matter is partly a point of view, a certain perspective based on relative size. To an electron moving within the matter-filled shell of an atom, the material of that shell appears to be an amorphous continuum. From our molar body point of view, though, the material shell (including its circulating electron waves) is part of a particle, the atom. That atom may be part of a particle, a molecule.

**Exther**: is all material which is not a persisting part of a given unit. With respect to that unit, then, all extrinsic ether is “exther.”

**Gax**: gaussian coordinate system

**Gram**: is the weight of one cubic centimeter of water at sea level at the equator of Earth at standard temperature and pressure.

**Inther**: Matter that has been organized into a persistent shape, a form, may be considered intrinsic material to the particulate object so formed. Such intrinsic ether may be called “inther.”

**Inx**: is the influx of ether in a venturi response to a motion parallel to the core of a unit. “Inx” includes in its scope of meaning the ether, the direction of flow of the causative agent, the core in question, and the source imbalance being sated by that influx. Inx has polarity, in that the ether can flow either in or out from the core. Because there is a limited amount of ether within the core of a unit and a limitless supply outside the unit, the tendency is for the inx effect to draw ether into the matter-unit thus increase the inner dinsity.

**Lax**: local coordinate system.

**Macs**: master coordinate system. (Also called Max.)
**Mass:** Mass is the weight of an object, in grams, when at rest on Earth under standard conditions. One c.c. of water has a mass of one gram. The mass of other objects compares the strength of their response to that of such a bit of water.

The “gravitational mass” of an object is the strength of its reaction to a given gravitational field, thus its local weight in that field.

A pull at the end of an object stretches the matrix and shells, decreasing their density in the pull's direction. The greater gradient being therefore in the opposite direction, the ontropic response will also be in the opposite direction to that in which the object is being pulled. A push at the end of an object compresses the matrix and shells, increasing their density on the side of the push. The greater gradient being therefore in the opposite direction to that of the acceleration, the ontropic response will be in the opposite direction to that in which the object is being pushed. Whether from a push or a pull, the weight of this reactive response is called “inertial mass”.

All matter exerts an ontropic counter-pressure when compressed, but only atomic matter has weight due to a gravitational field. That's because only atoms (lasting Particles) have trapped, refracted energies that cause a unidirectional net counter-pressure to arise in the side of increased density of its inhere. Accordingly, atomic matter has both gravitational weight and inertial weight; while raw matter can have inertial weight but has no gravitational weight thus no mass. The trapping patterns intrinsic to atoms make the difference.

**Matter:** is that substance which occupies space. It is the stuff we are familiar with as the essential part of tangible solid, liquid and gaseous objects. From lifelong sensory experience of it, all of us know what is here meant by “matter”.

Matter exists in two modes, amorphous and particulate. The amorphous form of matter is a frictionless, non-particulate, compressible fluid. A particle is a patterned portion of material that maintains a lasting identity as a specific unit. It is nevertheless made of the amorphous substance.

Particulate matter-units interact to form various states such as solid, liquid and gaseous. The modes and states of matter are interconvertible.

Matter has a few basic properties. The passive properties are that it is intrinsically compressible, that it persists eternally, that it is movable and that it has extension no matter how strongly compressed. It has one familiar active property, namely, the more it is compressed the more strongly it resists further compression. It presses back. It presses outwardly in all directions from any point. It is therefore bodily expandable. Matter is the most primary basic item because none of the others could exist without it.
**Matter-unit**: The self perpetuating configurational patterns into which matter is constrained by the actions of pressure and motion repeat at specific levels of organization to form what we shall call “matter-units”. The material component of such units belongs to and travels as part of them. In so doing, such matter-units bodily displace the surrounding medium through which they travel. One of the aims of this work is to show how the basic items operate to form these lasting, discrete units which keep given portions of material as a permanent part of their construction. In a restricted sense, such objects could be called “particles” instead of matter-units. The hierarchy of matter-units that we shall consider, however, encompasses things which are too big to simply be called particles.

A matter-unit may be made of myriad smaller units, each of which may be able to move through the surrounding material that is part of the parent unit. Nevertheless, the material of such member units is part of the continuum of material forming and owned by the larger unit. In our terms, then, a “continuum” need not be homogeneous nor internally self stationary.

For example, despite the many varied motions of the waters of the oceans the material of these oceans belongs to and is part of the planet Earth. Portions of the material of a unit are capable of moving about within the unit even though they remain part of that unit.

The parent unit composed of a continuum of multiple smaller units is the privileged frame of reference for mathematical treatment of the actions of its parts.

The matter-unit hierarchy consists of atoms, molecules, planets, planetary systems, stars and stellar systems such as the solar system, binary star systems etc., galaxies, galactic groups and ultimately the unconfined, yet patterned universe.

**Max**: master coordinate system. (Also called Macs.)

**Motion**: is the process of changing place from any here to any there. Through direct experience of it, independently of any definitions in words or mathematics, we all know what motion is.

**Organization**: denotes the variable degree of relative concentration of matter, its actions, and its inter-related patterns.

**Pressure**: is any affirmative tension such as you feel from a squeeze on the wrist. It is always matter that exerts pressure and it is always matter upon which pressure is exerted.

Both matter and pressure are capable of motion.
**Relation**: denotes the juxtaposition of things to each other, with respect to where and when they are. The physical relations in space and time play a controlling role in how things are made, how they act and what they are.

Relation is the main subject of the mathematical language of Physics. With respect to that, however, there is a duality to relation. There is a real and “physical relation” that exists between real things whether measured or not; and there is an abstract “metrical relation” obtained with the metrical tools used to measure such real relationships.

There is physical extension in all directions, the totality of which can be called “space”. There is also conceptual metrical extension, which is measurable in arbitrarily chosen numbers of dimensions using arbitrarily agreed upon units of measure.

There is temporal duration, which can be called “time”; as well as the abstract metrical dimension, “time”, with which we measure arbitrarily chosen portions of physical duration in terms of agreed upon units of measure.

We may, herein, use the terms “physical” and “absolute” interchangeably as far as relation is concerned. For example, absolute velocity denotes the degree of physical motion through the material of the field in which it occurs. “Relative” velocity is the measured velocity with respect to anything at all.

**Rinx**: The flow of a local sorce imbalance into the local environment, round about, is termed “rinx”, a sort of round-inx even though the imbalance doesn’t actually flow circularly.

Inx and rinx are the mechanism by which matter-units and their internal (and externally radiating) patterns are formed. Inx-rinx effects remain within the inther of shell-layers of matter-units of any and all levels of the matter-unit hierarchy, but also radiate into the thereby affected surroundings.

In present Physics, pressure is thought to be the resultant of the bombardment of myriad individual kinetic atomic or molecular particles against an object so bombarded. When pressed, however, all matter presses back. In its free form, matter automatically seeks to expand (it presses back!), thus exerts expansive pressure in all directions from any point. That is why we need a new word, “sorce”, to denote a basic pressure that permeates matter independently of the presence of kinetic particles.

**Sorce**: denotes the expansive pressure exerted by matter from every point because of matter's basic property of resisting compression. The more matter is condensed the more strongly it resists further compression. Being highly compressible, matter will move whenever a local pressure change occurs within
or upon it. It does this in response to unequal pressures so as to restore a pressure equilibrium in the zone.

Though sorce represents a basic pressure that is everywhere, local pressures may change due to many causes. A gravitational field, for example, causes the weight of the particles in it to increase the local pressure as one descends toward the gravitational source. This added pressure is different from the expansive pressure, sorce, exerted everywhere by the expansive property of matter itself.

It is this sorce pressure that indirectly maintains particles in their organized form. Most of the constructions in this work are based on the events required to obtain a uniform sorce pressure throughout any local field.

Though sorce tends to equalize in all directions, the actions required for matter to achieve such uniformity of sorce spread at finite speeds. sorce thus never succeeds in reaching the same value everywhere. Matter exerts and contains and resists that sorce pressure. Since matter is everywhere, so is sorce.

**Vacuum**: A vacuum is a space devoid of particles. In terms of this definition, a vacuum can be filled with basic, undifferentiated material substance. It just can't have particles in it. What distinguishes this definition for our purposes is that this “vacuum” is not empty, unless one specifies that it is a “void vacuum”.

**Venturi Effect**: An effect expressing the direct relationship between fluid motion and fluid pressure. A venturi effect is measured either as a decrease in surrounding pressure perpendicular to the direction of an accelerated fluid flow, or an acceleration of fluid flow when the fluid is forced through a narrow or restricted area. The increased speed, in the second case results in a reduction in pressure perpendicular to the fluid flow.

**Void**: is a hypothetical condition in which there is an absence of all matter. Such a condition is always hypothetical because one can never prove that there is not a more rarified form of matter beyond ones ability to detect it. There is also no known mechanism for creating or stabilizing such a condition. In fact such a void may be considered a self-negating concept. It cannot exist because it doesn’t possess the attribute of causality.

**Weight**: Weight is a measure of the grams of pressure that a ponderable (atomic) body exerts against any other body that interferes with its state of rest or motion. In a sense, weight measures the strength of the pressure exerted by a ponderable body against whatever hinders it from being accelerated by a force.